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Vol. 970 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

May 2, 1978

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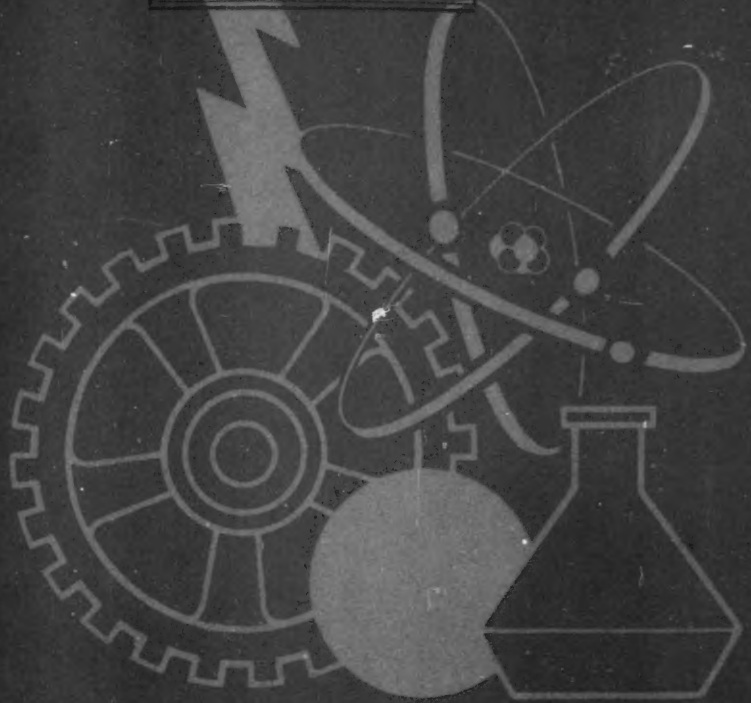

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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

May 2, 1978 Volume 970 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,043,045, L. P. Martuch, FLY FISHING LINE, **filed** July 10, 1975, D.C., N.D. Iowa (Sioux City), Doc. C-75-4039, *Minnesota Mining and Manufacturing Company* v. *Berkley & Company, Inc.* Judgment and order, defendant agrees to and the court hereby dismisses with prejudice the defendant's first and second counterclaims, Oct. 26, 1977.

3,077,724, Stoddard and Seem, APPARATUS FOR PROCESSING YARNS, **filed** Nov. 4, 1977, D.C., W.D.N.C. (Charlotte), Doc. C-C-0315, *Lex Tex. Ltd. Inc.* v. *Scragg North America, Inc.*

3,124,674, Edwards and Wheatley, DATA COLLECTION AND DISTRIBUTION SYSTEM, **filed** Aug. 25, 1971, D.C., S.D.N.Y., Doc. 71-C-3781, *Electronic Assistance Corp.* v. *City of New York, New York City Off-Track Betting Corp., American Totalisator Co., Inc. and Computer Sciences Corp.* Judgment, plaintiff is owner of said patent. The complaint for infringement of said patent is dismissed with prejudice as to all defendants. Plaintiff is hereby permanently enjoined from in any way stating that said patent is infringed by defendants or from attempting to prevent defendants from freely manufacturing, using or selling the CSC automated off-track betting system, entered Oct. 11, 1977.

3,152,292, Gostyn and Chasens, CORRECTING MAGNETIC ARRANGEMENT FOR DEFLECTION YOKES, **filed** Nov. 7, 1977, D.C., E.D.N.Y. (Brooklyn), Doc. 77-C-2211, *General Instrument Corp.* v. *Thordarson Meissner, Inc.*

3,293,272, E. H. Freund, MANUFACTURE OF SUCCINYL MONOGLYCERIDE; **3,370,958,** same, COMPOSITIONS COMPRISING SUCCINYL HALF ESTERS, **filed** June 28, 1976, D.C., M.D. Fla. (Orlando), Doc. 76-259-Orl-C-Y, *Eastman Kodak Company* v. *Southern Shortening Incorporated.* Consent judgment, plaintiff is owner of said patents, except as to the terms of agreement dated Sept. 30, 1977, defendant is hereby permanently enjoined against infringing any claim of said patent. Defendant's counterclaims and complaint are hereby dismissed with prejudice, Oct. 26, 1977.

3,256,219, G. Will, PROCESS FOR THE PRODUCTION OF POROUS PLASTICS AND PRODUCTS COMPRISING POLYMERIZING A MONOMER IN A WATER-IN-OIL EMULSION, **filed** Oct. 26, 1977, D.C., S.D. Ohio (Cincinnati), Doc. C-1-77-602, *Ashland Oil, Inc.* v. *Reichold Chemicals Inc.*

3,295,399, L. K. Juneau, AXLE NUT WRENCH, **filed** Aug. 30, 1977, D.C., M.D. La. (Baton Rouge), Doc. 77-349, *Lewis Kermit Juneau* v. *Robert L. Matthews, M & M Tool, Inc. and Pelican Tool Sales, Inc.*

3,305,873, J. Mourier, GRAPHIC RECORDER, **filed** Nov. 2, 1977, D.C., N.D. Calif. (San Francisco), Doc. C-77-2473-SW, *Broomall Industries Inc.* v. *Zeta Research Inc.*

3,351,118, M. E. Ward, MEANS FOR SUPPLYING AIR TO A GAS BURNER; **3,391,982,** same, GAS BURNER, **filed** Nov. 14, 1977, D.C., N.D.N.Y. (Utica), Doc. 77-CV-452, *Andro Corporation and The Tappan Company* v. *Dieter E. Grether.*

3,370,958. (See 3,293,272.)

3,391,982. (See 3,351,118.)

3,486,495. H. W. Allen, ARCHERY BOW WITH DRAW FORCE MULTIPLYING ATTACHMENTS, **filed** Nov. 1, 1977, D.C., N.D. Utah (Salt Lake City), Doc. NC-77-0072, *Allen Archery, Inc.* v. *Browning Manufacturing Company and Browning.* **Same, filed** Nov. 1, 1977, D.C., N.D. Utah (Salt Lake City), Doc. NC-77-0073, *Allen Archery, Inc.* v. *Bingham Projects, Inc., Elmont L. Bingham and Joyce M. Bingham.* **Same, filed** Nov. 1, 1977, D.C., N.D. Utah (Salt Lake City), Doc. NC-77-0074, *Browning Manufacturing Company* v. *Holless W. Allen and Allen Archery.*

3,524,255, P. F. Kurer, METHOD OF ATTACHING A TOOTH CROWN TO A TOOTH ROOT, **filed** Nov. 14, 1977, D.C., E.D. Pa. (Philadelphia), Doc. 77-3917, *Peter F. Kurer* v. *Ford & Bridge.*

3,613,430, S. R. Crees, WIRE BENDING APPARATUS; **4,052,879,** same, CABLE BENDER, **filed** Nov. 14, 1977, D.C., M.D. Fla. (Orlando), Doc. 77-473-Orl-C-R, *Manufacturing Research Corporation* v. *Graybar Electric Company, Inc.*

3,696,807, R. Szpur, MEDICAL ELECTRODE WITH RELATIVELY RIGID ELECTROLYTE CUP; **3,701,346,** Patrick, Jr. and Szpur, MEDICAL ELECTRODE; **3,713,435,** R. Szpur, PICKUP ELECTRODE WITH RIGID ELECTROLYTE CUP; **3,820,531,** same, MEDICAL ELECTRODE, **filed** Feb. 20, 1973, D.C., W.D. Wash. (Seattle), Doc. C73-124, *NDM Corporation* v. *Hayes Products, Inc. and Joseph H. Johnson.* Judgment of dismissal, Nov. 2, 1977.

3,701,346. (See 3,696,807.)

3,713,435. (See 3,696,807.)

3,733,309, Wyeth, Newman and Gay, BIAXIALLY ORIENTED POLY(ETHYLENE TEREPHTHALATE) BOTTLE, **filed** Nov. 18, 1977, D.C. Del. (Wilmington), Doc. C.A. 77-450, *E. I. du Pont de Nemours & Co., Inc.* v. *PepsiCo, Inc.*

3,776,274, J. C. Riley, APPARATUS FOR EFFECTING CHEMICAL TREATMENT OF A LIQUID FLOWING THROUGH A PIPE, **filed** Nov. 9, 1977, D.C. Ariz. (Tucson), Doc. C-77-255, *Karl Dusek* v. *Jack C. Riley et ux and Aquadene, Inc.*

3,804,251, Farrell, Bianchi and Johanson, FLOATAGE COLLECTING APPARATUS AND METHOD, **filed** Oct. 27, 1977, D.C., W.D. Wash. (Seattle), Doc. C77-756M, *Bennett Pollution Controls, Inc. and Bennett Pollution Controls Limited* v. *JBF Scientific Corporation.*

3,819,494, L. R. Fountain, METHOD OF REMOVING BRAZE; **3,958,984,** same, METHOD OF REMOVING A BRAZING ALLOY FROM STAINLESS STEEL, **filed** Oct. 25, 1977, D.C., W.D. Tex. (San Antonio), Doc. SA-77-CA-333, *Fountain Plating Co., Inc. and Laurence R. Fountain* v. *Chromalloy American Corporation.*

3,820,531. (See 3,696,807.)

3,826,057, J. W. Franklin, ROLLERWAY FOR HANDLING MOLDING APPARATUS; **3,924,618,** same, TRUSS SYSTEM; **4,005,629,** same, TRUSS BOLT DRIFT PIN, **filed** Oct. 31, 1977, D.C. N. Mex. (Albuquerque), Doc. C-77-685M, *Form-Exe-Systems, Inc.* v. *Ecco International, Ltd. and Raymond B. Ledbetter.*

3,869,952, H. N. Rowe, PICKUP MOUNT FOR STRINGED MUSICAL INSTRUMENTS, **filed** Nov. 1, 1977, D.C., M.D. Tenn (Nashville), Doc. 77-3490-NA-CV, *Rowe-Dearmond, Inc.* v. *Lawrence Sound Research, Inc.*

3,901,999, Landis and Williams, LIFT SWING FURNACE, **filed** Nov. 19, 1975, D.C.N.J. (Trenton), Doc. 75-2354, *Inductotherm Corporation* v. *Pillar Corporation.* Action reported settled. Stipulation and order of dismissal, Nov. 2, 1977.

3,938,602, Sly and Salmans, SLICING SYSTEM WITH AUTOMATIC PORTION WEIGHT CONTROL, **filed** June 1, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1949, *Eugene L. Sly* v. *Portion Systems Inc.* Stipulated decree dismissing complaint, Nov. 4, 1977.

3,942,618. (See 3,826,057.)

3,958,984. (See 3,819,494.)

3,977,136, P. D. Daniels, WALL PANELING: **3,996,703,** same, same, **filed** Oct. 28, 1977, D.C., E.D. Mo. (St. Louis), Doc. 77-1153C(4), *The Swan Corporation* v. *Novi American, Inc.*

3,995,102, J. E. Kohaut, INSERT DEVICE FOR CABLES, **filed** Nov. 10, 1977, D.C.N.J. (Newark), Doc. 77-2310, *Raceway Components, Inc.* v. *Dual-Lite, Inc.*

3,996,703. (See 3,977,136.)

4,005,629. (See 3,826,057.)

4,052,879. (See 3,613,430.)

4,058,317, J. B. McCarthy, APPARATUS FOR PLAYING A BOARD GAME, **filed** Nov. 15, 1977, D.C.N.J. (Camden), Doc. 77-2346, *Smurfit Cartons Ltd. et al.* v. *K-Tel International Limited et al.*

D. 243,217, E. E. Warsaw, SOFA, **filed** Apr. 6, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c1158, *Sheffield Furniture Corp.* v. *Kingsley Manufacturing Co.* Filed certified copy of transfer order issued by Judicial Panel on Multidistrict Litigation Docket #309 directing that this case be transferred to USDC

Central District of California and to be assigned case #CV77-3432-DWW in that court, Sept. 27, 1977.

Re. 29,083, K. Nielsen, ATOMIZER WHEEL FOR THE ATOMIZATION OF SUSPENSIONS OF HARD-WEARING MATERIALS, filed Sept. 27, 1977, D.C., M.D. La. (Baton Rouge), Doc. 77-386, *Aktieselskabet Niro Atomizer* v. *Ciba-Geigy Corporation.*

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,363,422, Re. S.N. 875,808, Filed Feb. 7, 1978, Cl. 61/53.66, METHOD AND APPARATUS FOR ANCHORING A TIE-DOWN BAR IN AN EARTH SITUS, Lee A. Turzillo (deceased), by Lucille L. Turzillo (executrix), Owner of Record: *Inventor,* Attorney or Agent: George S. Baldwin, et al., Ex. Gp.: 351

3,500,501, Re. S.N. 877,565, Filed Feb. 13, 1978, Cl. 425/563, NOZZLE SHUT-OFF DEVICE, Oskar R. Johansson, Owner of Record: *Cincinnati Milacron Inc., Cincinnati, Ohio,* Attorney or Agent: Daniel P. Worth, et al., Ex. Gp.: 322

3,810,174, Re. S.N. 886,966, Filed Mar. 16, 1978, Cl. 343/5 DP, DIGITAL SCAN CONVERTER, James L. Heard, et al., Owner of Record: *Hughes Aircraft Company, Culver City, Calif.,* Attorney or Agent: William H. MacAllister, et al., Ex. Gp.: 222

3,949,064, Re. S.N. 885,829, Filed Mar. 13, 1978, Cl. 424/1, METHOD OF DETECTING ANTIGENS OR ANTIBODIES, Irene Bornstein, et al., Owner of Record: *Baxter Laboratories, Inc., Morton Grove, Ill.,* Attorney or Agent: John P. Kirby, Jr., et al., Ex. Gp.: 223

3,949,378, Re. S.N. 783,878, Filed Apr. 1, 1977, Cl. 364/200, COMPUTER MEMORY ADDRESSING EMPLOYING BASE AND INDEX REGISTERS, Robert P. Crabb, et al., Owner of Record: *The United States of America as represented by The Secretary of The Navy, Washington, D.C.,* Attorney or Agent: Richard S. Sciascia, et al., Ex. Gp.: 237

3,973,215, Re. S.N. 880,233, Filed Feb. 22, 1978, Cl. 330/51, CURRENT MIRROR AMPLIFIER, Adel Abdel Aziz Ahmed, Owner of Record: *RCA Corporation, Princeton, N.J.,* Attorney or Agent: H. Christoffersen, Ex. Gp.: 252

3,991,617, Re. S.N. 882,279, Filed Feb. 28, 1978, Cl. 73/425.4 P, DEVICE FOR EJECTING THE REMOVABLE TIP OF A PIPETTE, Eric J. H. Marteau D'Autry, Owner of Record: *Inventor,* Attorney or Agent: Richard D. Mason, et al., Ex. Gp.: 244

4,004,830, Re. S.N. 877,564, Filed Feb. 13, 1978, Cl. 280/763, LANDING GEAR CONSTRUCTION, Jack T. Belke, Owner of Record: *Westran Corporation, Muskegon, Mich.,* Attorney or Agent: Ernest I. Gifford, et al., Ex. Gp.: 316

4,015,139, Re. S.N. 881,840, Filed Feb. 27, 1978, Cl. 307/141, CONTROLLED DURATION SWITCH, John M. Cleary, et al., Owner of Record: *Inventors,* Attorney or Agent: George E. Kersey, Ex. Gp.: 217

4,024,111, Re. S.N. 885,107, Filed Mar. 9, 1978, Cl. 260/75 T, CROSS-LINKABLE COMPOUNDS BASED ON SATURATED POLYESTERS, Philippe Thomas, et al., Owner of Record: *Rhone-Poulenc Industries, Paris, France,* Attorney or Agent: Leo A. Rosetta, et al., Ex. Gp.: 143

4,045,466, Re. S.N. 881,303, Filed Feb. 27, 1978, Cl. 260/465 E, 3-CYANOALKYLTHIO- OR 3-ALKOXY-CARBONYLMETHYLTHIO-2,6-DINITROANILINES, James R. Beck, et al., Owner of Record: *Eli Lilly and Company, Indianapolis, Ind.,* Attorney or Agent: Arthur R. Whale, et al., Ex. Gp.: 124

4,054,416, Re. S.N. 881,842, Filed Feb. 27, 1978, Cl. 23/259, APPARATUS FOR USE IN INVESTIGATING SPECIMENS, Ian David Duff, Owner of Record: *The Secretary of State for Social Services, London, England,* Attorney or Agent: Arland T. Stein, et al., Ex. Gp.: 171

PATENT NOTICES

Certificates of Correction for the Week of May 2, 1978

Re. 29,307	4,035,960	4,053,183	4,061,851
D. 235,319	4,035,981	4,053,187	4,062,224
D. 240,919	4,036,348	4,053,192	4,062,645
D. 244,095	4,036,819	4,053,214	4,062,757
D. 246,936	4,036,897	4,053,256	4,062,763
3,566,933	4,036,992	4,053,534	4,062,807
3,684,707	4,037,008	4,053,582	4,062,823
3,853,356	4,037,882	4,053,742	4,062,853
3,866,180	4,038,400	4,054,303	4,062,865
3,926,548	4,038,473	4,054,440	4,062,961
3,933,484	4,038,753	4,054,446	4,062,967
3,952,820	4,039,134	4,054,598	4,062,975
3,966,619	4,039,158	4,054,678	4,063,140
3,976,454	4,039,627	4,054,679	4,063,193
3,981,163	4,039,896	4,054,746	4,063,353
3,989,120	4,040,512	4,055,502	4,063,431
3,999,615	4,041,183	4,055,706	4,063,551
4,004,199	4,041,803	4,056,043	4,063,808
4,004,958	4,042,123	4,056,672	4,063,851
4,005,405	4,042,137	4,056,682	4,063,928
4,005,848	4,042,695	4,056,704	4,064,120
4,007,422	4,042,996	4,056,841	4,064,329
4,008,331	4,043,679	4,056,995	4,064,398
4,012,427	4,045,797	4,057,122	4,064,452
4,014,701	4,045,833	4,057,138	4,064,663
4,015,209	4,046,034	4,057,151	4,064,845
4,017,193	4,046,908	4,057,240	4,064,923
4,018,302	4,046,983	4,057,307	4,064,925
4,018,364	4,047,506	4,057,651	4,064,980
4,018,404	4,047,996	4,058,264	4,065,092
4,021,782	4,048,345	4,058,402	4,065,241
4,022,456	4,049,010	4,058,407	4,065,759
4,022,632	4,049,017	4,058,708	4,065,957
4,022,754	4,049,055	4,058,724	4,066,291
4,022,896	4,049,068	4,058,808	4,066,292
4,023,592	4,049,457	4,058,947	4,066,548
4,023,597	4,049,517	4,059,341	4,066,952
4,023,661	4,049,573	4,059,629	4,067,647
4,023,746	4,049,788	4,059,702	4,067,695
4,024,730	4,049,799	4,059,795	4,068,030
4,025,488	4,049,875	4,059,836	4,068,121
4,025,721	4,049,893	4,059,985	4,068,178
4,030,386	4,050,192	4,060,077	4,068,254
4,030,681	4,050,964	4,060,541	4,068,308
4,030,699	4,051,055	4,060,610	4,068,351
4,031,118	4,051,126	4,060,820	4,068,362
4,031,312	4,051,143	4,061,177	4,068,488
4,031,453	4,051,441	4,061,178	4,068,733
4,031,556	4,051,792	4,061,212	4,069,107
4,032,451	4,052,250	4,061,266	4,070,451
4,032,658	4,052,478	4,061,274	4,070,768
4,032,792	4,052,545	4,061,422	4,071,562
4,032,797	4,052,698	4,061,429	4,075,772
4,035,096	4,052,887	4,061,503	4,076,869
4,035,503	4,052,973	4,061,776	4,076,948

Dedication

3,731,054.—*Lester E. Bair,* Brownsville, Tex. HEAT SEALER. Patent dated May 1, 1973. Dedication filed Dec. 5, 1977, by the assignee, *Promotional Merchants, Inc.*

Hereby dedicates to the Public the entire remaining term of said patent.

Patents Available for Licensing or Sale

D. 240,772. JACKET OR SIMILAR ARTICLE. Jerome Williams, 385 Linoleum Way, Pittsburgh, Pa. 15219.

D. 242,263. THE ASHTRAY FOR STOPPING SMOKING. Jack Golden and Philip Jager, 5025 Broadway, New York, N.Y. 10034 and 2839 Decature Ave., Bronx, N.Y. 10458. Correspondence to: Jack Golden, 5025 Broadway, New York, N.Y. 10034.

3,333,198. TELEVISION CONVERTER FOR CATV SYSTEM. Ronald C. Mandell and George Brown-Stein, Correspondence to: E. M. Keys, Oak Industries Inc., Crystal Lake, Ill. 60014.

3,546,805. PORTABLE FISHING POLE HOLDER AND ALARM. Allen A. Schaefer, % G. W. Allen, 1423 Mariowe Ave., Cincinnati, Ohio 45224.

3,680,237. OUT-DOOR ILLUMINATED SIGN. John G. Finnerty, 251 De Grand Ave., Teaneck, N.J. 07666.

3,871,844. BIRD-DEBRIS SAFETY SCREEN-GUARD FOR JET POWERED AIRCRAFT. Frank F. Calvin, Sr., 3792 Donaldson Drive, Chamblee, Ga. 30341.

3,910,080. BICYCLE HITCH LOCK. Harold Dorsey, Jr., 911 Elmwood St., Evanston, Ill. 60202.

3,953,983. REFRIGERATION METHOD AND REFRIGERATION APPARATUS FOR CARRYING OUT THE METHOD. Ernst Sander, Correspondence to: Craig & Antonelli, 909 Watergate Office Bldg., 2600 Virginia Ave. N.W., Washington, D.C. 20037.

3,979,066. SKIN PROTECTIVE DEVICE. James S. McCartney, 4814 S. 292 St., Auburn, Wash. 98002.

3,981,452. IRRIGATION PIPES WITH DRIPPER UNITS AND METHOD OF ITS MANUFACTURE. Gershon Eckstein, Correspondence to: Perry Carvellas, Esq. 413 N. Washington St., Alexandria, Va. 22314.

3,983,039. NON-SYMMETRICAL REFLECTOR FOR ULTRA-VIOLET CURING. Bernard J. Eastland, Olney, Md. Correspondence to: Donald M. Spero, president, Fusion Systems Corporation, 11810 Parklawn Drive, Rockville, Md. 20852.

4,040,507. AUTOMATIC TRAILER SWAY SENSING AND BRAKE APPLYING SYSTEM. Herman A. Reise, 513B Portsmouth Drive, Lakewood, N.J. 08701.

4,044,476. EDUCATIONAL METHODS AND DEVICES. Jeanette B. Marsh, 1400 North Lake Shore Drive, 14–M, Chicago, Ill. 60610.

4,047,997. METHOD FOR MANUFACTURING A FLATTENED CYLINDRICAL FILM CONSISTING OF LAYERS OF THERMOPLASTIC RESIN STRETCHED LENGTHWISE AND CROSSWISE. Michio Sudo, Tokyo, Japan. Correspondence to: Michael J. Striker, 360 Lexington Ave., New York, N.Y. 10017.

4,054,880. SANITARY TUBULAR NAPKIN FOR MALES. Dexter J. Logan, P.O. Box 1012, West Covina, Calif. 91793.

4,060,909. DIRECT READING SURVEY ROD. Eugene Collins, East Star Route, Box 196, Portales, N. Mex. 88130.

4,064,880. SANITARY TUBULAR NAPKIN FOR MALES. Dexter J. Logan, P.O. Box 1012, West Covina, Calif. 91793.

4,066,087. PEA SHELLING DEVICE. Rolza J. Rodgers, Centerville, Ga. Correspondence to: Frederick L. Bergert, Crystal Square No. 5, 1755 Jefferson Davis Hwy., Arlington, Va. 22202.

4,068,106. WELDING APPARATUS. John V. Shaputis, Route #1, 115 Muskie Trail, Marris, Ill. 60450.

4,073,083. FISHING WORM THREADER. Chester B. Davis, 3921 Continential Way, Carmichael, Calif. 95608.

4,076,201. ADJUSTABLE CHAIR SPINDLE ASSEMBLY. Walter E. Hudnall, 2157 W. 236th Place, Torrance, Calif. 90501.

4,082,947. SOLAR COLLECTOR CONTROLLER. George L. Haywood, The George L. Haywood Co., P.O. Box 2602, Evergreen, Colo. 80439.

The following two patents are offered by Kenneth E. Macklin, 180 South Broadway, White Plains, N.Y. 10605.

4,011,545. COMPUTER AND COMMUNICATIONS SYSTEMS EMPLOYING NEW ARCHITECTURES.

4,074,253. NOVEL BISTABLE LIGHT MODULATORS AND DISPLAY ELEMENT AND ARRAYS THEREFROM.

The following two are offered by Roberta Page, 53 Vermulyea Ave., New York, N.Y. 10034.

3,043,936. THERMOSTAT-LINER MECHANISM.

3,097,285. THERMOSTAT-LINER DEVICE.

The following two patents are offered by John Trutor, Benson, Vt. 05731.

3,376,933. PIPE HANDLING MACHINE.

3,921,725. COMBINATION TOOL FOR HUSBANDRY PURPOSES.

The following patents are offered by Seymour Rothstein, 125 South Wacker Drive, Chicago, Ill. 60606.

3,854,767. ROPE ASSEMBLY.

4,036,101. DOUBLE HOLLOW BRAIDED ROPE ASSEMBLY AND METHOD.

The General Electric Company is prepared to grant nonexclusive licenses under the following patents upon reasonable terms to domestic manufacturers.

Applications for license under the following patent should be addressed to: Patent Counsel, Drive Systems Department, General Electric Company, 1501 Roanoke Blvd., Salem, Va. 24153.

4,068,811. HOTBOX DETECTOR.

Applications for licenses may be addressed to the Patent Counsel, Mobile Radio Products Dept., General Electric Company, Lynchburg, Va. 24502.

4,069,455. ARRANGEMENT FOR MAINTAINING RECEPTION OF A RADIO RECEIVER ON THE STRONGER OF TWO SIGNALS.

Applications for licenses may be addressed to the Patent Counsel, Mobile Radio Products Dept., General Electric Company, Lynchburg, Va. 24502.

4,072,903. STORAGE CIRCUIT FOR PAGING RADIO RECEIVERS.

The Applied Physics Laboratory of The Johns Hopkins University has the following patents available for licensing.

3,682,518. MAGNETIC FLUID BEARING.

3,694,042. RADIAL FLUID BEARING.

3,712,448. VARIABLE SPEED SIDEWALK.

3,756,692. PHOTOCHROMIC PROTECTIVE EYE SHIELD LENS.

3,781,818. DATA BLOCK MULTIPLEXING SYSTEM.

3,808,508. TEMPERATURE COMPENSATOR FOR FLUXGATE MAGNETOMETER.

3,842,961. VARIABLE SPEED HANDRAIL.

3,853,068. MECHANICALLY-LINKED PERSONAL RAPID TRANSIT SYSTEM.

3,866,859. METHOD AND APPARATUS FOR DEFINING AN EQUIPOTENTIAL PLANE IN THE ELECTROSTATIC FIELD IN THE ATMOSPHERE UTILIZING ROTATING POTENTIAL SENSING PROBES.

3,868,074. METHOD AND APPARATUS FOR ALTITUDE DETECTION AND STABILIZATION OF AN AIRBORNE VEHICLE USING THE ELECTROSTATIC FIELD IN THE EARTH'S ATMOSPHERE.

3,873,050. ATTITUDE SENSING METHOD AND APPARATUS.

3,893,447. SIMULTANEOUS ANGIOGRAPHY OF THE SEPARATE RETINAL AND CHOROIDAL CIRCULATIONS.

3,916,320. LORAN RECEIVER SIGNAL CANCELLER.

3,928,801. METHOD AND APPARATUS FOR SENSING RATE OF ANGULAR DISPLACEMENT.

3,947,849. LORAN RECEIVER-NAVIGATOR.

4,047,170. MONOTRACK RADAR RECORDING/PLAYBACK SYSTEM.

Interested parties should contact Patent Counsel, Applied Physics Laboratory, The Johns Hopkins University, Johns Hopkins Road, Laurel, Md. 20810.

The RCA Corporation offers to grant nonexclusive licenses on reasonable terms and conditions under the patents listed below. Inquiries respecting licenses under RCA patents should be addressed to RCA Corporation, staff vice president, Domestic licensing, 30 Rockefeller Plaza, New York, N.Y. 10036.

4,066,485. METHOD OF FABRICATING A SEMICONDUCTOR DEVICE.

4,066,918. PROTECTION CIRCUITRY FOR INSULATED-GATE FIELD-EFFECT TRANSISTOR (IGFET) CIRCUITS.

4,067,000. REMOTE CONTROL TRANSMITTER WITH AN AUDIBLE BATTERY LIFE INDICATOR.

4,067,010. CIRCUIT FOR INHIBITION OF AUTOGENETIC FALSE ALARMS IN A COLLISION AVOIDANCE SYSTEM.

4,067,048. AUTOMATIC BEAM CURRENT LIMITER.

4,068,008. FOOD PRODUCT EXTRUSION APPARATUS AND METHOD.

4,068,182. DIRECT-COUPLED CASCADE AMPLIFIER WITH AUTOMATICALLY ADJUSTED QUIESCENT OUTPUT SIGNAL LEVEL.

4,068,184. CURRENT MIRROR AMPLIFIER.

4,068,390. PHOTOMACK DRYER.

4,067,788. METHOD FOR CRACKING BRITTLE MATERIAL.

4,069,094. METHOD OF MANUFACTURING APERTURED ALUMINUM OXIDE SUBSTRATES.

4,069,431. AMPLIFIER CIRCUIT.

4,069,432. SIGNAL COMPARATOR CIRCUIT.

4,069,439. FLAT PANEL DISPLAY WITH BEAM INJECTION CLEANUP.

4,069,484. DEFECT PLOTTING SYSTEM.

4,069,492. ELECTROLUMINESCENT SEMICONDUCTOR DEVICE HAVING A BODY OF AMORPHOUS SILICON.

4,069,500. ARRANGEMENTS FOR TESTING COLOR TELEVISION SYSTEMS.

4,069,577. METHOD OF MAKING A SEMICONDUCTOR DEVICE.

4,070,206. POLYCRYSTALLINE OR AMORPHOUS SEMICONDUCTOR PHOTOVOLTAIC DEVICE HAVING IMPROVED COLLECTION EFFICIENCY.

4,070,627. DOUBLE TUNED INPUT CIRCUIT FOR TELEVISION TRANSMITTER AMPLIFIER.

4,071,211. MOMENTUM BIASED ACTIVE THREE-AXIS SATELLITE ATTITUDE CONTROL SYSTEM.

4,071,217. RELEASABLE MOUNTING SYSTEM.

4,071,426. METHOD OF MAKING HIGH RESISTANCE CERMET FILM.

4,071,706. DATA PACKETS DISTRIBUTION LOOP.

4,071,751. AUTOMATIC OPTICAL BIAS CONTROL FOR LIGHT MODULATORS.

4,071,776. SAWTOOTH VOLTAGE GENERATOR FOR CONSTANT AMPLITUDE SAWTOOTH WAVEFORM FROM VARYING FREQUENCY CONTROL SIGNAL.

4,071,777. FOUR-QUADRANT MULTIPLIER.

4,071,825. ADAPTIVE DELTA MODULATION SYSTEM.

4,071,852. TRANSISTOR HAVING IMPROVED JUNCTION BREAKDOWN PROTECTION INTEGRATED THEREIN.

4,072,876. CORRUGATED SHADOW MASK ASSEMBLY FOR A CATHODE RAY TUBE.

4,072,884. BRUSHLESS PHASE LOCKED SERVO DRIVE.

4,072,905. WIDE ACQUISITION RANGE MASK DEMODULATOR INPUT CIRCUIT.

4,072,910. VOLTAGE CONTROLLED OSCILLATOR HAVING EQUALLY CONTROLLED CURRENT SOURCE AND CURRENT SINK.

4,072,912. NETWORK FOR TEMPERATURE COMPENSATION OF AN AT CUT QUARTZ CRYSTAL OSCILLATOR.

4,072,943. MULTI-TARGET TRACKER.

4,072,947. MONOTONICALLY RANGING FM-CW RADAR SIGNAL PROCESSOR.

4,072,974. SILICON RESISTIVE DEVICE FOR INTEGRATED CIRCUITS.

4,072,983. SECAM IDENTIFICATION CIRCUIT.

4,072,985. VIDEO DISC WITH A DIELECTRIC LAYER FORMED FROM STYRENE AN NITROGEN.

4,074,139. APPARATUS AND METHOD FOR MASKLESS ION IMPLANTATION.

4,074,181. VOLTAGE REGULATORS OF A TYPE USING A COMMON-BASE TRANSISTOR AMPLIFIER IN THE COLLECTOR-TO-BASE FEEDBACK OF THE REGULAR OR TRANSISTOR.

4,074,205. INPUT STAGE FOR FAST-SLEWING AMPLIFIER.

4,074,209. WIDE RANGE FREQUENCY MODULATION OF NARROW LOOP BANDWIDTH BASE-LOCKED OSCILLATORS.

4,074,307. SIGNAL PROCESSOR USING CHARGE-COUPLED DEVICES.

4,074,308. DELAY LINE NETWORK FOR PROCESSING A COMPOSITE ELECTRICAL SIGNAL.

4,074,313. ELECTRON BEAM DISC RECORDER.

4,075,575. INPUT STAGE FOR FAST-SLEWING AMPLIFIER.

4,075,610. METHOD OF STORING OPTICAL INFORMATION.

4,075,690. WRITE ENHANCEMENT CIRCUIT.

4,076,191. SPACECRAFT COMPONENT ROTATION MEANS.

4,076,366. HIGH VOLTAGE ELECTRON TUBE BASE WITH SEPARATE DIELECTRIC FILL-HOLE.

4,076,426. METHOD FOR INSPECTING CATHODE-RAY-TUBE WINDOW FOR OBJECTIONABLE CORD.

4,076,573. METHOD OF MAKING PLANAR SILICON-ON-SAPPHIRE COMPOSITE.

4,076,992. VACUUM TUBE GRID STRUCTURES OF PHOSMIC BRONZE HAVING COPPER AND COPPER ALLOY CONICAL SUPPORTS.

4,076,994. FLAT DISPLAY DEVICE WITH BEAM GUIDE.

4,077,008. PHASE LOCKED LOOP TUNING SYSTEM WITH STATION SCANNING PROVISIONS.

4,077,051. VIDEO DISC WITH A CONDUCTIVE LAYER HAVING AN OXYGEN CONTENT GRADIENT.

4,077,052. VIDEO DISC CAPACITIVE RECORDING MEANS WITH A CONDUCTIVE BILAYER.

4,077,054. SYSTEM FOR MODULATING A FLAT PANEL IMAGE DISPLAY DEVICE.

4,077,505. VIDEO DISC PLAYER EMPLOYING A SPRING LOADED STYLUS APPARATUS.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MARCH 25, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-12-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-16-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	7-25-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	5-25-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	4-14-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	12-27-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	10-1-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	3-9-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-23-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	5-10-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	2-28-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	7-14-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	2-16-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	3-9-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	5-18-77

Expiration of patents: The patents within the range of numbers indicated below expire during March 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,973,519 to 2,977,597, inclusive
Plant Patents..... Numbers 2,032 to 2,039, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED MAY 2, 1978

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T970,001
BICHROMOPHORIC COMPOUNDS AS ULTRAVIOLET STABILIZERS FOR DYES ON POLYESTER FABRICS

Joseph S. Zannucci, 1112 Buckelew Dr., and Gether Irick, Jr., 424 Meadow La., both of Kingsport, Tenn. 37663

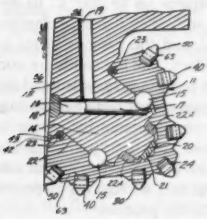
Filed Apr. 18, 1977, Ser. No. 788,473
Int. Cl.[2] D06P *3/00*
U.S. Cl. 8—165
No Drawing. 5 Pages Specification

Bichromophoric compounds in which one of the moieties is a benzoxazole group and the second moiety is a hydroxybenzophenone group are excellent ultraviolet light stabilizers for disperse dyes on specific polyester fibers, and for both disperse and basic dyes on specific basic dyeable polyester fibers.

T970,002
CUTTING ELEMENTS FOR DRILL BITS

Harry E. Kidder, Rolling Hills, and Robert F. Evans, La Habra, both of Calif., assignors to Smith International, Inc., Newport Beach, Calif.

Continuation of Ser. No. 737,328, Nov. 1, 1976, abandoned. This application Sep. 15, 1977, Ser. No. 833,480
Int. Cl.[2] B23P *3/26*; E21B *9/36*; E21C *13/01, 13/02*
U.S. Cl. 175—374
1 Sheets Drawing. 23 Pages Specification



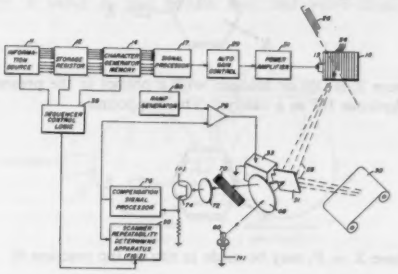
A cutting element for mounting in a rolling cone cutter of a rock drill bit has a notch in the periphery of its base for improved retention of the cutting element in the rolling cone cutter. The longitudinal axis of the notch is essentially transverse to the direction of insertion of the cutting element into the rolling cone cutter. To maximize the effectiveness of the notch in improving retention of the cutting element, preferably the notch is sharp lipped.

T970,003
SCANNER REPEATABILITY ERROR DETERMINING APPARATUS

John Edward Newton, 8 Llewellyn St., Portsmouth, Va. 23707, and Mark Alan Simon, 901 Elmgrove Rd., Rochester, N.Y. 14650

Filed Feb. 22, 1977, Ser. No. 770,963
Int. Cl.[2] G01D *5/30*
U.S. Cl. 250—230
3 Sheets Drawing. 17 Pages Specification

A scanner repeatability error determining apparatus for use with a line scanning apparatus which includes a galvanometer responsive to a complex signal having ramp signal and compensation signal components for driving a line scan mirror. The compensation signal is a function of variations in velocity of the line scan mirror from a desired velocity. The apparatus includes circuitry for defining a predetermined range for the



compensation signal and when such compensation signal is outside of this range produces an indication that there is a repeatability error.

T970,004
AMBIENT CURABLE SATURATED EPOXY RESIN COMPOSITIONS

Ronald S. Bauer, Houston, Tex., assignor to Shell Oil Company

Continuation of Ser. No. 707,908, Jul. 22, 1976, abandoned. This application Jun. 27, 1977, Ser. No. 810,237
Int. Cl.[2] C08G *59/54*
U.S. Cl. 260—18 EP
No Drawing. 17 Pages Specification

Saturated epoxy resin compositions, e.g., glycidyl polyethers of hydrogenated bisphenol A, may be cured in 3 to 7 days at ambient temperatures with aliphatic amines and polyamides in the presence of selected catalysts such as para-toluenesulfonic acid, boron trihalide complexes and stannous salts of monocarboxylic acids.

T970,005
STABILIZATION OF WET P-BENZOQUINONE WITH METAL CHELATING AGENTS

Michael Palmer, 2545 Essex Dr., Kingsport, Tenn. 37660, and Ted L. Douglas, Rte. 10, Blakely Dr., Kingsport, Tenn. 37664

Filed May 31, 1977, Ser. No. 802,092
Int. Cl.[2] C07C *45/24, 49/64*
U.S. Cl. 260—396 R
No Drawing. 4 Pages Specification

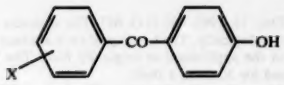
Metal chelating agents such as citric acid can be used to reduce color formation and decomposition of p-benzoquinone containing from 0.1% to 18% moisture level.

T970,006
MANUFACTURE OF HALOPHENOLS

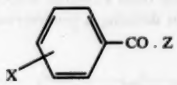
John Brewster Rose, Letchworth, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jul. 1, 1977, Ser. No. 812,438
Claims priority, application United Kingdom, Jul. 9, 1976, 28674/76
Int. Cl.[2] C07C *45/14*
U.S. Cl. 260—591
No Drawing. 8 Pages Specification

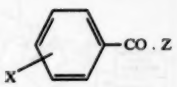
Halophenols of formula



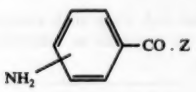
where X = halogen, are made by condensation of a compound



where Z is OH or halogen with a phenol in the presence of anhydrous HF as a catalyst. The compound



where X = F, may be made in situ by the reaction of



with an alkali metal nitrite in anhydrous HF.

T970,007

URANIUM RECOVERY FROM WET-PROCESS PHOSPHORIC ACID

John F. McCullough; John F. Phillips, Jr., and Leslie R. Tate, all of Florence, Ala., assignors to Tennessee Valley Authority

Filed Mar. 25, 1977, Ser. No. 781,216
Int. Cl.[2] C01G *43/00*
U.S. Cl. 423—10
2 Sheets Drawing. 19 Pages Specification

A method of recovering uranium from wet-process phosphoric acid wherein the acid is treated with a mixture of an ammonium salt or ammonia, a metallic reducing agent such as iron, aluminum or zinc, and then a miscible solvent such as methanol. The precipitated solids, which are separated from the purified phosphoric acid, consist of a mixture of metal phosphates and uranium. This solid is dissolved in acid and the uranium recovered from the solution by liquid-liquid solvent extraction. The miscible solvent and some water are distilled away from the purified phosphoric acid. The distillate is rectified, the water discarded, and the miscible solvent recovered for recycle.

When the miscible solvent is methanol, the optimum ranges of ammonia and methanol are 0.05 to 0.20 gram atom nitrogen per gram atom phosphorus and 1.93 to 3.15 pounds methanol per pound of orthophosphoric acid. The amount of reducing agent added should be sufficient to reduce all uraniun to U(IV). Under these conditions, >99 percent of the uranium is precipitated from the wet-process acid. About 90 percent of the phosphorus in the acid is recovered as purified phosphoric acid.

T970,008

REMOVAL AND RECOVERY OF SULFUR OXIDES FROM GAS STREAMS WITH MELAMINE

John J. Kohler, Florence; Joe Gautney, Sheffield; Yong K. Kim, and John F. McCullough, both of Florence, all of Ala., assignors to Tennessee Valley Authority

Filed May 5, 1977, Ser. No. 794,269
Int. Cl.[2] C01B *7/00*
U.S. Cl. 423—243
2 Sheets Drawing. 56 Pages Specification

A process for the removal and recovery of sulfur oxides from gas streams by contacting the gas stream with an aqueous suspension of melamine containing an oxidation inhibitor such as para-phenylenediamine whereupon a mixture of solid, hydrated melamine sulfites and solid, hydrated melamine sulfate is formed. The solids are then separated from the reaction product and the clarified liquid recycled. The solids are then heated to temperatures up to 200° C to decompose the hydrated melamine sulfites into free melamine, gaseous water, and sulfur dioxide, and the gaseous water and sulfur dioxide withdrawn as product. The hot solids are cooled and split into two portions. One portion is recycled and the other portion is treated with an aqueous inorganic base stronger than melamine such as ammonia or potassium hydroxide to decompose the contained melamine sulfate into free melamine and a basic sulfate salt solution. The basic sulfate salt solution is separated from the melamine and withdrawn as product and the melamine is recycled to the process.

REISSUES

MAY 2, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

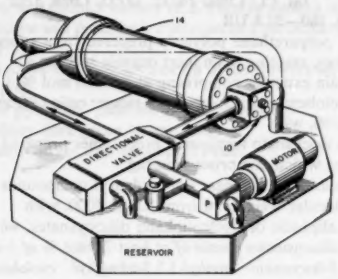
Re. 29,620
SELF-MONITORED FLUID PRESSURE BOOSTER SYSTEM

Franck Picker, Oak Ridge, Tenn., assignor to Oak Ridge Machines, Oak Ridge, Tenn.

Original No. 3,928,969, dated Dec. 30, 1975, Ser. No. 473,217, May 24, 1974. Application for reissue Jul. 2, 1976, Ser. No. 702,236

Int. Cl.[2] F15B *15/18*

U.S. Cl. 60—428 **26 Claims**



1. A self-monitored fluid pressure booster device comprising:

a. a body having a bore connectable to a fluid pressure operated mechanism and inlet port means and outlet port means connected to the bore;

b. a shiftable sliding means in the bore having means to control fluid flow to and from said outlet and inlet port means in response to pressure in the fluid operated mechanism;

c. pressure converter means associated with said sliding means to convert a high volume low pressure fluid flow into a low volume high pressure flow;

d. said sliding means being mounted to shift from a first position in which the fluid control means directs the fluid flow from the inlet port into the mechanism to a second position in which the fluid control means directs the fluid flow from the inlet port through the pressure converter means to the mechanism and the outlet port means.

Re. 29,621
VARIABLE CAPACITY MULTIPLE COMPRESSOR REFRIGERATION SYSTEM

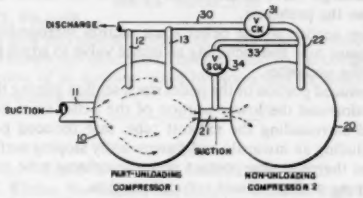
Thomas F. Conley, Staunton, Va., and Ernest F. Gylland, Jr., Seattle, Wash., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Original No. 3,775,995, dated Dec. 4, 1973, Ser. No. 272,704, Jul. 17, 1972. Application for reissue Oct. 14, 1976, Ser. No. 732,697

Int. Cl.[2] F25B *41/00*

U.S. Cl. 62—196 A **3 Claims**

1. A variable capacity multiple compressor refrigeration system comprising first and second *hermetic shell* refrigerant compressors, each compressor having suction inlet and discharge ports, *the first compressor having its suction inlet port* adapted to be connected to the suction line of the system, *and the second compressor having its suction inlet port connected to the interior of the shell of the first compressor so that gas received by said second compressor is received only through the shell of said first compressor,* means to connect the discharge ports in parallel to the refrigeration system, means to cycle-off said second compressor while the first compressor continues to run for reduced capacity of the system, a check valve in said means to connect to prevent discharge gas from said first compressor from entering the discharge port of the second cycled-off compressor, a bypass line connected to the suction of the system and to said means to connect at a point between the check valve and the discharge port of the second compressor, a valve in said bypass line, and valve control



means to control said valve to be closed when both compressors are running and to be open when said second compressor is cycled-off, *said first compressor is a multiple cylinder compressor having means to controllably unload some of its cylinders for running part unloaded to reduce the capacity of the system and said first compressor is always running when the system is operating.*

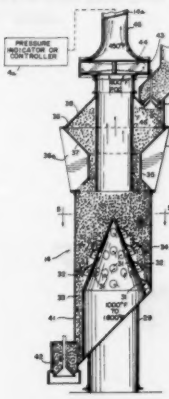
Re. 29,622
APPARATUS AND PROCESS FOR PELLET PREHEATING AND VOLATILE RECYCLING IN A GLASS MAKING FURNACE

Karl H. Lange, Allison Park, Pa., assignor to Pullman Incorporated, Chicago, Ill.

Original No. 3,953,190, dated Apr. 27, 1976, Ser. No. 599,440, Jul. 28, 1975. Continuation of Ser. No. 386,112, Aug. 6, 1973, abandoned. Application for reissue Feb. 28, 1977, Ser. No. 772,610

Int. Cl.[2] C03B *5/16*

U.S. Cl. 65—27 **13 Claims**



1. A pellet preheater adapted to receive the exiting combustion gases from a glass furnace for heating pellets to be introduced to the glass furnace comprising

a tubular hot gas stack section adapted to being connected to

receive the exiting combustion gases from the glass furnace,

a top portion of the hot gas stack section being apertured to allow the combustion gases to pass therethrough,

a cylindrical exhaust tube to carry gases out of the preheater, and

a pellet containing stack section receiving and holding the pellets while they are heated and coated by the condensate from the combustion gases, said pellet stack section surrounding the hot gas stack section and the exhaust tube and including a lower portion, above that a reduced portion and above that a top section,

the lower portion of the pellet stack section surrounding the top portion of the hot gas stack section and including a discharge valve to allow discharge of the heated pellets from the preheater,

the top section of the pellet stack section surrounding the exhaust tube and including an intake valve to admit pellets to the preheater,

the reduced portion of the pellet stack section joining the top section and the lower portion of the pellet stack section and surrounding the exhaust tube, said reduced portion including an inwardly and downwardly sloping surface to heat the pellets by contact with the exhaust tube and the sloping surface of said reduced portion.

11. An improved process of making glass in a furnace having a main furnace melting section and a preheater and recycling structure comprising a glass batch pellet containing section communicating with said main furnace section, the steps of;

a. circulating heated gasses from the main furnace section through the glass batch pellet containing section; and

b. maintaining the pressure in the furnace slightly above atmospheric pressure by throttling the exhaust of gasses from the furnace downstream of said glass batch containing section and thereby increasing recirculation of the gasses through said glass batch containing section.

Re. 29,623

POLYURETHANE-UREAS BASED ON CIS-TRANS-1,4-DIAMINOCYCLOHEXANE

Harald Oertel, Odenthal-Gloebusch; Bruno Zorn, Cologne; Wilhelm Thoma, Bergisch-Neukirchen, and Klaus Noll, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Original No. 3,857,809, dated Dec. 31, 1974, Ser. No. 353,279, Apr. 23, 1973. Application for reissue Sep. 3, 1976, Ser. No. 720,183

Claims priority, application Germany, May 4, 1972, 2221798

Int. Cl.[2] C08G *18/32, 18/75;* **C08K** *5/02*

U.S. Cl. 260—33.8 UB **9 Claims**

1. A polyurethane polyurea prepared by a process which comprises, reacting in an inert organic solvent a

a. chain extender comprising at least 80 mol % 1,4-diamino cyclohexane with a cis/trans-isomer ratio of from 10/90 to 60/40, with

b. an isocyanato terminated prepolymer prepared by a process which comprises reacting

i. substantially linear polyhydroxyl compounds with molecular weights of from 500 to 5000, with

ii. aliphatic or cycloaliphatic diisocyanates, *wherein such diisocyanates consist of at least 75 mol % of 1-isocyanato-3-isocyanato methyl-3,5,5-trimethyl cyclohexane, the* molar ratio of hydroxyl groups to isocyanate groups being between about 1 : 1.5 and 1 : 5,

and evaporating the solvent.

PLANT PATENTS

GRANTED MAY 2, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,245
ERIOBOTRYA HYBRID

Ernest P. Bordier, Laguna Hills, Calif., assignor to Bordiers Nursery, Inc., Santa Ana, Calif.

Filed Dec. 6, 1976, Ser. No. 747,972
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—54 **1 Claim**

1. A new and distinct variety of *Eriobotrya deflexa,* substantially as shown and described, characterized particularly as to its novelty by:
the distinctive and unique coloring of the flowers which are light pink;
the large pyramidal panicles of the flowers;
by the shiny dark green leaves; and,
by the new leaves that are coppery-red.

4,246
PEONY PLANT NAMED AMERICA

Nathan H. Rudolph, Aurora, Ill., assignor to Klehm Boys Partnership, Arlington Heights, Ill.

Filed May 9, 1977, Ser. No. 795,165
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct peony cultivar substantially as herein shown and described, characterized by its large, fiery red flowers carried on strong, tall stems above an abundant growth of mint green foliage, by its vigorous, strong and healthy growth and by its very early spring flowering habit.

4,247
PEONY PLANT NAMED CORAL CHARM

Roy G. Klehm, Barrington, Ill., assignor to Klehm Boys Partnership, Arlington Heights, Ill.

Filed May 9, 1977, Ser. No. 795,310
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of peony plant substantially as herein shown and described, characterized by the coral-orange coloration of its medium sized blossoms and its mid-May annual flowering habit.

4,248
PEONY NAMED CHEDDAR GOLD

Roy G. Klehm, Barrington, Ill., assignor to Klehm Boys Partnership, Arlington Heights, Ill.

Filed May 9, 1977, Ser. No. 795,311
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of peony *lactiflora* substantially as herein shown and described, characterized by its profuse production of medium sized white flowers having spreading Japanese style, rounded guard petals which surround a large mass of yellow staminodes, at the center of which white petaloids generally appear.

4,249
PEONY PLANT NAMED BRIDAL ICING

Roy G. Klehm, Barrington, Ill., assignor to Klehm Boys Partnership, Arlington Heights, Ill.

Filed May 9, 1977, Ser. No. 795,312
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. The new and distinct peony plant cultivar substantially as herein shown and described, characterized by its improved and nearly perfect "bomb" type of flowers, and by its profuse production of very white flowers the appearance of which is enhanced by the warm inner glow from the yellow base coloring of the "bomb" petals.

PATENTS

GRANTED MAY 2, 1978

ERRATA

For CLASS	See PATENT NO.
400–057	4,086,997
209–009	4,087,004
220–441	4,087,041
366–131	4,087,079
071–105	4,087,277
071–106	4,087,278
426–068	4,087,330
568–766	4,087,410
544–251	4,087,422
544–251	4,087,423
544–385	4,087,424
544–383	4,087,425
568–817	4,087,467
568–723	4,087,569
569–899	4,087,471
568–906	4,087,472
264–078	4,087,494
235–449	4,087,660
325–030	4,087,677
362–297	4,087,682
313–230	4,087,721
364–900	4,087,794
365–185	4,087,795

PATENTS

GRANTED MAY 2, 1978

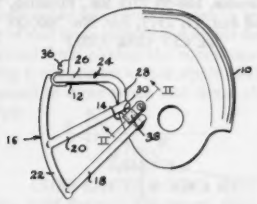
GENERAL AND MECHANICAL

4,086,664

FOOTBALL FACE GUARD

Delby C. Humphrey, Terre Haute, Ind., and Robert D. Humphrey, Litchfield, Ill., assignors to Schutt Manufacturing Company, Litchfield, Ill.

Filed Aug. 26, 1976, Ser. No. 718,058
Int. Cl.[2] A42B *3/00*
U.S. Cl. 2—9 **8 Claims**



1. A face guard for mounting on a protective helmet having a face opening with a top edge and side edges, said guard comprising; a plurality of laterally extending curved guard elements adapted to extend across the face opening of the helmet and a support element to which the rearward ends of said guard elements are connected, said support element having a top portion extending across the top edge of the helmet face opening and side portions extending down along the side edges of the face opening of the helmet, resilient first connector means rotatably engaging said support element top portion near the center and having means protruding from one side thereof adapted for connection to the adjacent region of the helmet, and resilient second connector means engaging a lower end part of each support element side portion near the lower end thereof and having means protruding from one side thereof adapted for connection to the adjacent region of the helmet rearwardly of the respective support element, each said lower end part of said support element side portion inclining downwardly toward the rear to dispose said lower end parts at such an angle that impacts delivered to the outwardly facing side of the face guard will be substantially at right angles to the axis of each said lower end part of the support member, the rearward ends of a pair of said guard elements being secured to each said lower end part on opposite sides of the respective second connector means in closely spaced relation thereto.

4,086,665

ARTIFICIAL BLOOD CONDUIT

Victor L. Poirier, Chelmsford, Mass., assignor to Thermo Electron Corporation, Waltham, Mass.

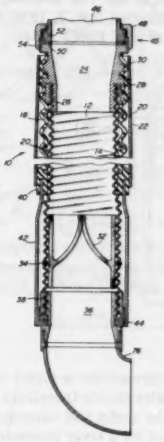
Filed Dec. 16, 1976, Ser. No. 751,232
Int. Cl.[2] A61F *1/24;* A61M *1/03*
U.S. Cl. 3—1.4 **5 Claims**

1. A blood conduit comprising:

a flexible inner tube for conducting a flow of blood and having a porous wall for permitting the development of a biologically stable interface between the interior surface of said inner tube and blood flow therethrough, said inner tube having a convoluted wall structure for providing flexibility without kinking;

a flexible, non-porous outer tube concentrically enclosing said inner tube, for preventing contamination, said outer tube having a convoluted wall structure for providing flexibility without kinking;

rigid ring means spaced along said conduit and located concentrically between said outer tube and said inner tube for providing radial strength to said conduit; and



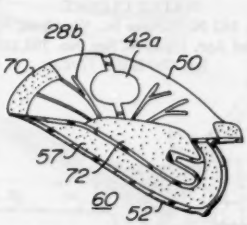
means affixing said ring means to said outer tube for providing said conduit with strength to resist collapse forces with axial components.

4,086,666

BREAST PROSTHESIS

Petras Vaskys, 128 Yew Rd., Cheltenham, Pa. 19012, and Arthur M. Pfrommer, Philadelphia, Pa., assignors to Petras Vaskys, Cheltenham, Pa.

Filed Apr. 30, 1976, Ser. No. 681,803
Int. Cl.[2] A61F *1/00;* A41C *3/10*
U.S. Cl. 3—36 **19 Claims**



1. A breast prosthesis comprising a cavity formed between a forward wall shaped in the form of a breast and a rear wall shaped to conform with the area of a missing breast, at least the forward wall being made of soft resilient material having a color which substantially simulates the color of skin, gel fill within the cavity, said rear wall having at least one chamber formed therein, said chamber being open at one end and formed within the rear wall with the chamber opening adjacent the wearer when the prosthesis is worn to provide for air circulation between the prosthesis and the wearer, breathing lines formed in the rear wall extending from the chamber along the rear wall toward the outer edge of the prosthesis whereby air is circulated between the chamber and through the lines, an additional chamber open at one end and formed in the rear wall with the opening adjacent the wearer, and an inlet line formed in the rear wall and extending from an edge of the prosthesis

into the chamber and from the additional chamber to the chamber.

4,086,667

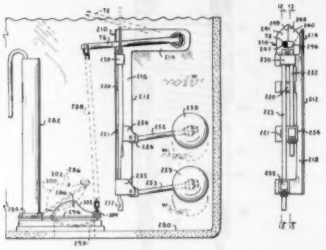
FLUSH CONTROL DEVICE FOR CONSERVING WATER

Louis F. Miklos, 6151 Delaware St., Merrillville, Ind. 46410

Continuation-in-part of Ser. No. 604,346, Aug. 13, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 673,005

Int. Cl.[2] E03D *1/34*

U.S. Cl. 4—325 **24 Claims**



1. A flush control device for a water tank comprising a stopper seated in an outlet liftable therefrom to allow the water to discharge through the outlet and wherein said lifting of said stopper is accomplished by a lever connected to said stopper by a link and lever being pivotable by a handle exterior of the tank,

guide means supported in said tank;

a rod member longitudinally movable in said guide means;

a float lever arm pivotally supported to laterally bear against said rod member to arrest said longitudinal movement of said rod member; and

means on said rod member for engaging said lever connected to lift said stopper, said means preventing pivotal movement of said lever when said rod member is arrested in its longitudinal movement.

4,086,668

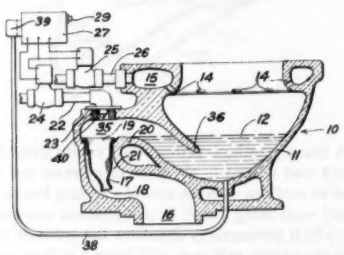
WATER CLOSET

Elton H. Tubbs, 162 N. Portage St., Westfield, N.Y. 14787

Filed Apr. 12, 1976, Ser. No. 704,248

Int. Cl.[2] E03D *11/02*

U.S. Cl. 4—425 **4 Claims**



1. In combination with a toilet bowl having a siphon forming outlet comprising,

a bowl,

said bowl having a sump for containing a quantity of water,

a downwardly directed outlet for said bowl communicating with said bowl to receive fluids from said bowl during flushing thereof,

a flexible open-ended tubular member in said outlet supported at its upper end and hanging downwardly therein and forming a flow path therethrough for said fluids whereby fluids flowing through said flexible tube cause the lower end of said tube to restrict the opening therethrough a jet nozzle adapted to be connected to the main water line under pressure said jet being supported above said flexible tube to direct water therethrough said flexible tube being adapted to be collapsed together by a differential in pressure between the pressure inside said tube and the pressure outside said tube thereby increasing the rate of flow of fluids by venturi action.

4,086,669

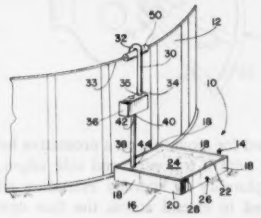
FOOT BATH

Christofalo C. Combis, 164-30 77th Rd., Flushing, N.Y. 11363

Filed Jan. 17, 1977, Ser. No. 760,158

Int. Cl.[2] A47K *3/022*

U.S. Cl. 4—182 **7 Claims**



1. A foot bath for use in conjunction with a swimming pool comprising:

an open-ended pan for resting on a supporting surface, said pan including a plurality of sidewalls and a base, said sidewalls fixedly secured to said base thereby forming an open-ended liquid storage chamber, said storage chamber accommodating the insertion of a human foot therein through said open-end thereof;

a chemical container forming a chemical storage chamber therein, said container having a filling aperture located therein for communicating liquids to said chemical storage chamber thereof;

means for communicating water at a controlled rate from said swimming pool into said chemical storage chamber of said chemical container; and

metered communicating means for communicating a predetermined quantity of said liquid within said chemical storage chamber to said open-ended liquid storage chamber of said open-ended pan.

4,086,670

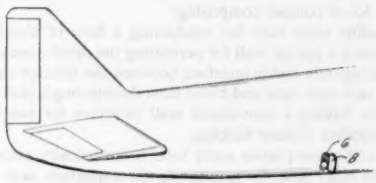
AIRCRAFT TOILET DRAIN ASSEMBLY

John D. Krause, Westminister, and Eugene F. Colditz, Huntington Beach, both of Calif., assignors to Kaiser Aerospace & Electronics Corporation, Irvine, Calif.

Filed Dec. 6, 1976, Ser. No. 747,736

Int. Cl.[2] A47K *1/14*

U.S. Cl. 4—295 **24 Claims**



1. A toilet drain assembly for an aircraft equipped with a toilet waste holding tank and an outlet tube leading from the

holding tank to a portion of the aircraft provided with an access opening and a movable access panel for opening and closing the access opening, the toilet drain assembly comprising,

an annular nipple connected to the outlet tube, having an open end;

mounting structure for connecting said nipple to the aircraft with said open end facing towards the access opening spaced in an axially inward direction therefrom;

a drain plug removably connected to said nipple extending thereacross spaced inwardly from said open end;

a cover removably positioned across the open end of said nipple in contact therewith; and

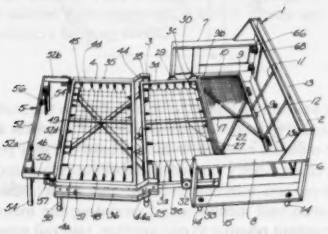
means connected to said cover responsive to the presence or absence of said drain plug in said nipple for preventing the access panel from closing the access opening when said drain plug is not present in said nipple and for allowing the access panel to close when said drain plug is present in said nipple.

4,086,671

CONVERTIBLE SOFA BED

Manning Lane, 3185 Patrisal, Cincinnati, Ohio 45236

Filed Jan. 24, 1977, Ser. No. 761,965
Int. Cl.[2] A47C *17/14*
U.S. Cl. 5—18 R **23 Claims**



1. A convertible sofa-bed having a retracted and extended position comprising in combination, a horizontal stationary section, a first telescoping section, first guide means operatively connecting said first telescoping section to said stationary section, a second telescoping section, second guide means operatively connecting said second telescoping section to said first telescoping section, said first and second guide means acting to dispose said first and second telescoping sections on opposite sides of said stationary section when said sofa-bed is in the retracted position, and said guide means serving to dispose said first telescoping section, said second telescoping section and said stationary section in substantially coplanar positions relative to each other when said sofa-bed is in the extended position.

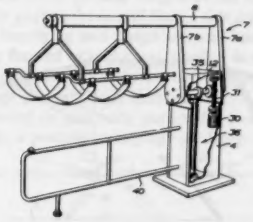
4,086,672

LIFTING DEVICE

Lars Agne Nilsson, Middelfartsvagen 9, 57200 Oskarshamn, Sweden

Filed Jul. 26, 1976, Ser. No. 708,772
Claims priority, application Sweden, Aug. 7, 1975, 7508892
Int. Cl.[2] A61G *1/02*
U.S. Cl. 5—81 R **24 Claims**

1. A lifting device for lifting a patient confined to bed, which device is adapted for cooperation with the patient from the foot or head end of the patient without obstructing access to the patient from the other end or from either side, said device comprising a horizontal drive shaft, a lever having one end connected to the drive shaft, and a carrier bar for arrangement along and over the patient and disposed parallel to the drive shaft, the carrier bar having one end connected to the other end of the lever and its other end being free, and the device further comprising patient supporting means suspended from the carrier bar and having two support portions disposed at opposite sides respectively of the patient when the carrier bar is arranged along and over the patient, at least one elongate support member which is insertable under the patient and is



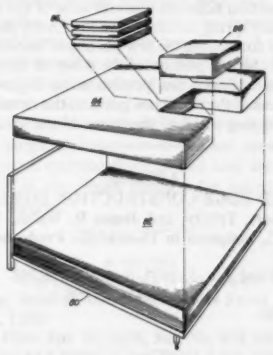
connectable at its opposite ends to the support portions respectively, and drive means connected to the drive shaft to bring about rotation thereof, thereby to move said carrier bar along an arcuate path.

4,086,673

ARTICULATED BED

Paul B. Hanson, 2761 Eastwood Dr., Decatur, Ga. 30032

Continuation of Ser. No. 533,980, Dec. 18, 1974, Pat. No. 3,991,428. This application Jul. 2, 1976, Ser. No. 702,022
Int. Cl.[2] A61G *7/10*
U.S. Cl. 5—92 **1 Claim**



1. An articulated bed comprising:

(a) a main rectangular box spring mattress support having a flat continuous horizontal upper surface;

(b) a flat horizontal U-shaped main mattress defining a central recess in one end thereof;

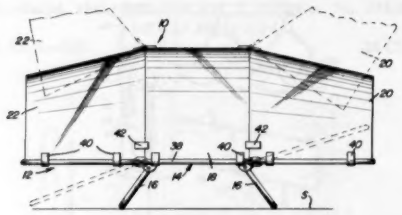
(c) removable mattress means received within and filling said recess, said removable mattress means having an upper surface coplanar with the upper surface of said main mattress and being removable from said recess to facilitate use of the main mattress and the recess for sexual intercourse, said removable mattress including a plurality of mattresses stacked vertically one on the other, within said recess, said removable mattresses being respectively individually removable to vary the effective height of the upper most surface of the remaining removable mattress, said removable mattress being supported on the upper surface of said mattress support.

4,086,674

WIND SHIELDING DOME

Carmine M. Chiaradonna, 39 Spring Rd., Lynn, Mass. 01912

Filed Dec. 10, 1976, Ser. No. 749,525
Int. Cl.[2] A47C *29/00*; E04B *7/10*
U.S. Cl. 5—113 4 Claims



1. A wind shielding dome for a multi-position lounge, comprising, in combination:

(a) a main dome section;

(b) a head dome section and a foot dome section each pivotally connected to the main dome section in spaced relation to one another for conforming to a lounge on which the dome is arranged; and

(c) fastener means for removably attaching the dome to the lounge, each of the main dome section, head dome section, and foot dome section being a curved element constructed from a transparent material, the curvature being transverse of the extent of the main dome section, head dome section and foot dome section, the fastener means including at least one clip comprising, in combination:

(1) a pair of levers, each having a handle portion and a jaw portion, with an arcuate recess provided in the jaw portion, with one of the levers being affixed to the main dome section adjacent a lateral edge of the section; and

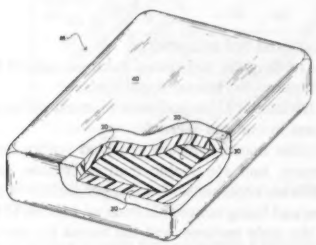
(2) a torsion spring connected to the levers and forming a fulcrum for biasing the jaw portion of each of the levers toward the jaw portion of the other of the levers, with the recess of each jaw portion being disposed opposite the recess of the other jaw portion, the recesses arrangeable gripping a rail of the frame of the lounge.

4,086,675

REINFORCED EDGE CONSTRUCTION FOR CUSHIONS

Miles E. Talbert, Trinity, and James R. Walsh, Thomasville, both of N.C., assignors to Thomasville Products, Inc., High Point, N.C.

Filed Jan. 5, 1977, Ser. No. 756,755
Int. Cl.[2] A47C *27/08*
U.S. Cl. 5—355 3 Claims



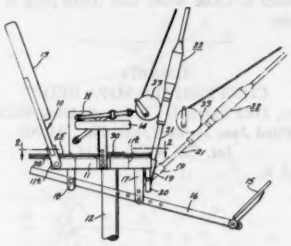
1. An improved, all foam, cushion construction comprising a central area of flexible foam sheet material of a prescribed thickness and having length and width dimensions forming a perimeter defining upper and lower surfaces with intermediate side walls; a continuous outer band flexible foam material extending around and bonded to said side walls of said inner core; said outer band exhibiting substantially firmer characteristics than said central area to reinforce and stiffen the corners of the cushion to prevent edge collapse, said central area exhibiting a 25% ILD of no greater than 50 pounds and said outer band exhibitng a 25% ILD of at least 50 pounds.

4,086,676

AUXILIARY SEAT ASSEMBLY FOR SPORT FISHING CHAIR

Antonio E. Arruza, West Palm Beach, Fla., assignor to Sugar Supply, Inc., Belle Glade, Fla.

Filed Jun. 10, 1977, Ser. No. 805,406
Int. Cl.[2] B63B *29/00*
U.S. Cl. 9—7 8 Claims



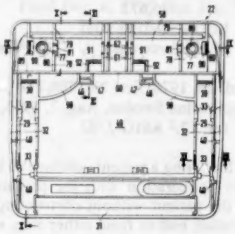
6. A seat assembly adapted to be installed on the seat portion of a pre-existing sport fishing chair, said seat assembly comprising: a base member adapted to mount onto the seat portion of the fishing chair, a body support member superimposed on said base member, and interengaged rail and guide means interposed between said members and mounting the members for sliding movement relative to one another, said rail means being substantially coextensive in length with said support member and said guide means being located relative to the base member to afford extension of the body support member from a retracted position overlying said base member into an extended position, extending in cantilever fashion beyond said base member.

4,086,677

CLEANING DEVICE

Johannes Liebscher, Nassau, Lahn, and Rolf G. Schulein, Singhofen, both of Germany, assignors to Leifheit International Gunter Leifheit GmbH, Nassau, Lahn, Germany

Filed Mar. 1, 1976, Ser. No. 662,934
Claims priority, application Germany, Mar. 4, 1975, 2509239
Int. Cl.[2] A47L *11/32*
U.S. Cl. 15—42 29 Claims



1. In a device for cleaning surfaces, a combination comprising a housing having a longitudinal and a transverse axis and transversely spaced lateral regions, said housing including a frame having longitudinally spaced front and rear wall por-

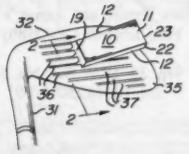
tions and transversely spaced lateral wall portions, a pair of support walls at each of said lateral regions between the respective lateral wall portion and said longitudinal axis and extending substantially parallel to said longitudinal axis with transverse spacing from one another, a partitioning wall extending substantially parallel to said transverse axis between the same and said front wall portion and bounding an enclosed space with the latter, and mounting walls extending between said partitioning wall and said front wall portion; a plurality of wheels; means for mounting said wheels on said support walls intermediate the same for rotation in engagement with the surface to be cleaned, including bearing recesses in said support walls having open ends facing towards the surface to be cleaned, mounting shafts for said wheels having mounting portions supported in said bearing recesses, and at least one cover mounted on said housing and having closing portions which close said open ends of said bearing recesses; at least one corner-sweeping brush at least one auxiliary wheel for driving said corner-sweeping brush; means for supporting said corner-sweeping brush and said auxiliary wheel on said mounting walls for rotation of the former about a brush axis which extends from said housing toward the surface to be cleaned, including at least one auxiliary bearing recess which has an open end facing toward the surface to be cleaned, and an auxiliary shaft for said auxiliary wheel partly received in said auxiliary bearing recess; and a closure for closing said enclosed space in direction toward the surface to be cleaned, having at least one auxiliary closing portion which closes said open end of said auxiliary bearing recess.

4,086,678

GOLF CLUB TOOL

Calvin D. Torr, P.O. Box 726, Easton, Pa. 18042

Filed Oct. 12, 1976, Ser. No. 731,735
Int. Cl.[2] A63B *57/00*
U.S. Cl. 15—105 **5 Claims**



1. A hand held golf club tool for cleaning mud and other debris from a golf club head having grooves and flat portions thereacross which comprises

a rectangular body having top and bottom surfaces,

at least one raised rib extending longitudinally along said top surface,

said raised rib being of rounded configuration in cross section adapted to fit in one of said grooves,

flat portions on said top surface on opposite sides of said rib,

said tool being cut away at one end at a first angle less than 90° to said top surface to provide said rib and said flats with a sharp edge, and

the end opposite to said last mentioned end being cut off at a second angle greater than 90° to said top surface to provide a sharp edge.

4,086,679

CARPET RETAINERS

Richard William Butler, St. Clair Shores, Mich., assignor to USM Corporation, Farmington, Conn.

Filed Jul. 15, 1976, Ser. No. 705,553
Int. Cl.[2] A47G *27/04*
U.S. Cl. 16—4 **5 Claims**

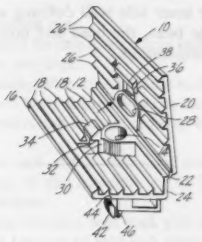
1. A one piece resilient fastener for retaining an edge portion of a sheet adjacent a panel comprising a body portion having an opening formed therethrough,

an elongated flange extending outwardly from one side of said body portion adjacent one end of said opening and substantially normal to said opening and spaced from one end of said body,

an elongated cover portion hinged at the opposite side of said body portion from said flange side and movable to a position overlying said flange and said body end portion,

an opening formed in said cover portion in alignment with said opening in said body portion positioned overlying said flange and said body portion,

means disposed on said body portion for locking said cover portion in a position overlying said flange and body portion,



means for connecting said fastener to said panel comprising an elongated boss extending from said body portion and in which the opposite end of said opening from said body is formed contiguous the opening in said body,

said boss having a shoulder formed thereon spaced from the end of said boss, said shoulder being of a greater width than either end of said elongated boss, and

a slot extending the length of said boss from the outer surface of said boss into said opening,

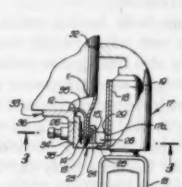
whereby said shoulder is flexed to provide a lesser width when said boss is introduced into an opening in said panel and returns to its initial width dimension after passing through the panel opening to initially retain said fastener on said panel, and said cover portion opening and said body portion opening through said boss are aligned with the cover in the closed position for insertion of a male fastener therein.

4,086,680

CASTER MOUNT ASSEMBLY

Eric L. Kelly, Rowley, Mass., assignor to Purex Corporation, Lakewood, Calif.

Filed Apr. 19, 1976, Ser. No. 678,450
Int. Cl.[2] B60B *33/04*; **B62B** *3/02, 5/00*
U.S. Cl. 16—30 **2 Claims**



2. A wheel connection to a receptacle having a bottom wall

and a bead projecting downwardly below the level of said bottom wall, comprising

(a) a wheel carrier adapted to extend at the outer side of the bead,

(b) means on the carrier including an angled bracket having a vertical leg, and an adjustable threaded fastener projecting proximate the bead and extending through the bracket for releasably retaining the bead between said vertical leg and the carrier, said bracket having an upper horizontal leg to extend in supporting relation directly beneath the receptacle bottom wall, said fastener having an adjustment head located directly below said upper horizontal leg,

(c) the carrier defining a laterally presented shoulder for engagement with the outer side of the receptacle at a location above the level of said bracket and bead, and

(d) the carrier inner side wall defining a notch for closely receiving the bead, the bead and notch having complementary configuration.

4,086,681

DOOR CLOSER

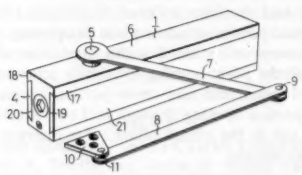
Yoshitaka Nakanishi, 12-9, Yawata 5-chome, Ichikawa-shi, Chiba-ken, Japan

Filed Nov. 16, 1976, Ser. No. 742,356

Claims priority, application Japan, Jun. 22, 1976, 51-72828

Int. Cl.² E05F *3/00*

U.S. Cl. 16—49 **6 Claims**



1. A door closer, comprising; a plate-shaped mounting bracket of generally rectangular cross-section and rectangular outline, which in use is fixed to a door, the bracket having two tongue-shaped coupling portions projecting from said cross-section and which, when the bracket is so fixed, extend horizontally longitudinally along and coextensive with upper and lower edges of said outline;

an elongate main body having means for linking a top thereof, in use, with a frame of the door to close the door, the main body also having two mutually parallel walls, each wall having an elongate groove recessed therein and coextensive with the main body, and each groove having undercut longitudinal edges shaped for slidable fit with the tongue-shaped coupling portions of the mounting bracket, so that the main body can be slidably engaged with the bracket, engaging one of the grooves in use of the main body on a left-handed door, whereas the bracket engages the other groove in use of the main body on a right-handed door; and

a cover plate for covering the groove not so engaged, the cover plate having a pair of tongue-shaped coupling portions similar to those of the bracket.

4,086,682

DEVICE FOR USE IN THE HUMANE SLAUGHTERING OF ANIMALS

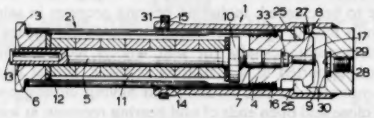
Roger John Hancox, Burntwood, England, assignor to Accles and Shelvoke Limited, Birmingham, England

Filed Sep. 27, 1976, Ser. No. 726,754

Claims priority, application United Kingdom, Oct. 3, 1975, 40451/75

Int. Cl.² A22B *3/02*

U.S. Cl. 17—1 B **10 Claims**



1. A captive bolt pistol device for use in the humane slaughtering of animals comprising: a hollow cap having a closed end and housing a fixed firing pin, and a barrel slidably received within said cap for respective relative movement and being readily separable for loading purposes, said barrel housing the captive bolt and having a breech block with a cartridge chamber at one end, said chamber opening to the rear end of said bolt and to the rear face of said breech block, and barrel retention means for separably coupling said barrel and cap together for use and for retaining said barrel and said cap in a firing position in which said firing pin is aligned with said cartridge chamber but spaced from said rear face, said barrel retention means being overridden by an impact force resulting from tapping the muzzle end of the device on an animal's head so producing relative movement between said cap and said barrel whereby a cartridge within said chamber impacts with said firing pin to fire such cartridge and shoot the bolt.

4,086,683

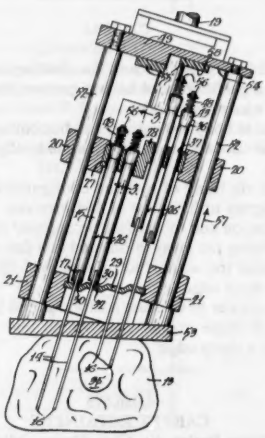
MEAT TENDERIZING APPARATUS

Lynn M. Davis, Boca Raton, and James V. Theis, Jr., Delray Beach, both of Fla., assignors to Hollymatic Corporation, Park Forest, Ill.

Filed Sep. 30, 1976, Ser. No. 728,402

Int. Cl.² A22C *9/00*

U.S. Cl. 17—25 **1 Claim**



1. A yieldable knife meat tenderizing apparatus particularly for meat that contains bones, comprising: a plurality of elongated knives each comprising a blade with a sharp meat penetrating and meat severing end and a piston on which said blade

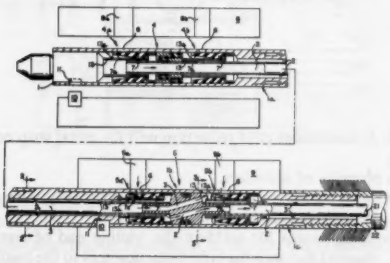
is mounted in substantial alignment; a transverse lock plate member having openings through each of which a said piston extends, each said piston comprising an end that is opposite to its said blade extending beyond said lock plate member; cooperating friction jam means on said piston and said lock plate member having cooperating tapered surface means for jam locking each said piston on said lock plate member when the piston is forced toward said lock plate member but releasable under a preselected reaction force on each said piston resisting said meat penetrating; conveyor means for conveying said meat to and from the vicinity of said lock plate member and knives; means for reciprocating said lock plate member and said jammed pistons and thereby said blades toward and away from said conveyor and to and from said meat penetrating positions of said blades; reset means engaged by said extended ends on reciprocation of said lock plate member and knives away from said conveyor for frictionally jamming said friction jam means together, said friction jam means on each said piston comprising a tapered member surrounding and movable relative to each said piston and tapered toward the meat severing end for engagement with a similar tapered surface means on said lock plate member; and spring means on each said extended end of each piston providing a predetermined jamming force on said tapered member when said pistons are reciprocated into engagement with said reset means.

4,086,684

SHIRRING MACHINE MANDREL

Roy Lane Trimble, Danville, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,562
Int. Cl.[2] A22C *11/02*
U.S. Cl. 17—41 **15 Claims**



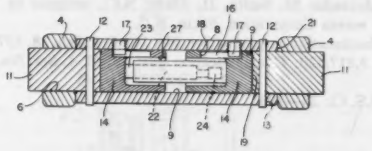
1. An improved mandrel for use on a shirring machine, said mandrel being of the type for continuously introducing two different fluids into the interior of a casing material being shirred thereon, said mandrel comprising an axially elongated body member, passageway defining means within said body member defining first and second passageways arranged in concentric relation, first and second sets of inlets formed in said body member, said sets of inlets being spaced axially of said body member, each set of inlets including a first inlet and a second inlet in communication with a respective one of said first and second passageways, and pressure responsive valve means associated with each of said inlets restricting flow through each inlet to incoming flow whereby said first and second passageways may be supplied fluids selectively at one of two spaced points in accordance with the spacing of said sets of inlets.

4,086,685

HARNESS RELEASE PIN

John A. Gaylord, San Diego, Calif., assignor to H. Koch & Sons, Anaheim, Calif.

Filed Dec. 17, 1976, Ser. No. 751,883
Int. Cl.[2] B64D *17/38*
U.S. Cl. 24—201 R **4 Claims**



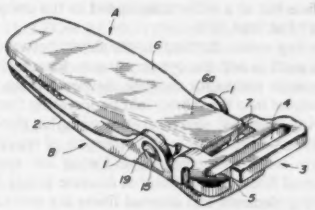
1. In a harness release pin
a connector element having spaced legs and axially registering passages in said legs,
a release body engageable by a harness webbing,
a hub of the release body fitting between the legs and having a passage therethrough in axial registry with the passages in said legs,
a lock pin in each end of the passage of said hub extending into the passage of the adjacent leg to hold said hub in connecting position,
expandable means between said lock pins for pushing said lock pins apart and out of said hub passage,
and controlled means to impart a force to such expandable means to expand in opposite directions to push said lock pins out of said hub passage into the respective leg passages for releasing said release body.

4,086,686

PLASTIC CLIP

Teruo Takabayashi, Kyoto, Japan, assignor to Kohshoh Limited, Kyoto, Japan

Filed Nov. 17, 1976, Ser. No. 742,642
Claims priority, application Japan, Feb. 24, 1976, 51-21219[U]
Int. Cl.[2] A44B *21/00*
U.S. Cl. 24—250 **3 Claims**



1. A plastic clip comprising an elongated generally flat upper clip member having front and rear ends and a pair of longitudinally extending sides and a journal portion extending laterally outwardly from each of the sides, an elongated generally flat lower clip member having front and rear ends and a pair of longitudinally extending sides and a side wall extending upwardly and laterally outwardly from a portion of each of the sides, each of the side walls having an opening in which one of the journal portions of the upper clip member is rotatably positioned, the uppermost point of each of the openings in said side walls at the inside surface of the side wall being positioned laterally outwardly of the lowermost point of the opening at the outside surface of the side wall whereby the upper and lower members can be assembled by pushing the journal portions of the upper clip member downwardly between the side walls of the lower clip member until the journal portions are positioned in the openings in the side walls, a spring between the upper and lower clip members for resiliently biasing the front ends of the upper and lower clip members apart, and a

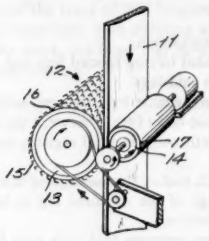
closing member movably mounted between the rear ends of the upper and lower clip members for moving the front ends of the clip members together.

4,086,687

APPARATUS FOR RELAXING OR LOOSENING NEEDLED TEXTILE FABRICS

Alexander M. Smith, II, Elkin, N.C., assignor to The Fiberwoven Corporation, Elkin, N.C.

Continuation-in-part of Ser. No. 221,614, Jan. 28, 1972, Pat. No. 3,817,820. This application Jun. 13, 1974, Ser. No. 479,141
Int. Cl.[2] D04H *1/48*
U.S. Cl. 28—103 **30 Claims**



1. An apparatus for loosening the needled structure of a textile fabric having an overall bulk density of at least 8 pounds per cubic foot comprising:

(1) a moveable surface having discrete fabric penetrating elements projecting therefrom for penetrating the fabric and producing planar forces on the internal fibers of the fabric;

(2) a moveable cooperating friction surface for cooperating with the moveable surface and providing to the fabric an opposite force to the force exerted by the moveable surface;

(3) moving means for moving the cooperating friction surface and moving means for moving the moveable surface in the same direction as the movement of the cooperating surface but at a differential speed to the cooperating surface of at least 10%;

(4) feeding means for feeding the fabric between the moveable surface and the cooperating surface; and

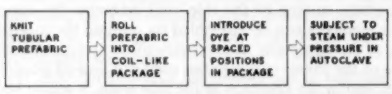
(5) pressure means for causing the penetrating elements to penetrate into the fabric; said cooperating friction surface having frictional characteristics such that the cooperating surface will not slip in the direction of movement of the fabric whereby compressive forces are applied to the internal fibers of the fabric at discrete points by the penetrating elements and internal fibers are moved relative to other fibers.

4,086,688

METHOD FOR IMPARTING COLORATION TO A KNIT/DEKNIT TEXTILE YARN

Edward J. Dombrowski, Rte. 7, Box 262 Pinewood Circle, Asheboro, N.C. 27203

Continuation-in-part of Ser. No. 664,553, Mar. 8, 1976, abandoned. This application Nov. 1, 1976, Ser. No. 737,476
Int. Cl.[2] D02G *1/00*; D04B *19/00*
U.S. Cl. 28—218 **7 Claims**


KNIT TUBULAR PREFABRIC
ROLL PREFABRIC INTO COIL-LIKE PACKAGE
INTRODUCE DYE AT SPACED POSITIONS IN PACKAGE
SUBJECT TO STEAM UNDER PRESSURE IN AUTOCLAVE

1. An improved method of imparting space dyed color variations to a knit/deknit textile yarn of the type which is knit into a tubular prefabric, the tube rolled into a coil-like package having substantially circular side surfaces, heat set, and subsequently deknit to impart a desired textured characteristic to the yarn, comprising the steps of:

a. positioning said coil-like package of tubular prefabric to at least one dyeing station while rolled into said package;

b. applying dye at said dyeing station to selected areas on at least one of the circular side surfaces of said package in such amounts as to seep of its own volition throughout a plurality of adjacent convolute layers;

c. discontinuously with the dyeing, subjecting said package to an autoclave while still in the rolled up configuration to simultaneously set the dye and the knit stitch.

5. A method of space dyeing a textured yarn comprising the steps of:

a. knitting synthetic, heat settable yarn on a circular knitting machine to form a tubular prefabric;

b. rolling up the knit tube into a coil-like package having substantially circular side surfaces;

c. discontinuously with the knitting introducing dye to the edges of said tubular fabric at a plurality of selected points on at least one circular side surface of said coil-like package in such amounts that the dye will seep of its own volition throughout a plurality of adjacent convolute layers;

d. applying steam heat to said package to simultaneously set the dye and the stitch; and

e. prior to further treatment other than dyeing unraveling the knit tube to form a textured yarn having completely random color variations along the length thereof.

4,086,689

CONTINUOUS STRIP REDUCTION COLD MILL

Judson W. Martt, Amsterdam, Ohio, assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Oct. 29, 1976, Ser. No. 737,019
Int. Cl.[2] B23Q *39/00*
U.S. Cl. 29—33 B **12 Claims**

1. A continuous cold reduction mill for metal strip comprising

a plurality of uncoilers,

a metal strip handling means for alternatively taking metal strip from each uncoiler,

welding means for welding the trailing end of metal strip running through the cold reduction mill to the leading end of metal strip coming off an uncoiler,

metal strip storage means following the welding means in the direction of strip movement for accumulating under high speed strip handling tension a length of running metal strip which can be continuously fed into the mill while a weld is being made,

a mill stand having a center line relative to metal strip movement through the mill stand and including a pair of work rolls for exerting cold reduction pressure on metal strip passing between them,

drag generator means,

a metal strip back tensioning unit ahead of the mill stand relative to strip movement, the back tensioning unit including a plurality of successive strip engaging rolls, at least one of the strip engaging rolls being operatively connected to the drag generator means,

means for conveying the metal strip from the strip storage means to the metal strip entrance side of the back tension-

ing unit while maintaining the metal strip between the strip storage system and the entrance side of the back tensioning unit under an entrance tension of the magnitude of the tension in the strip storage system,

means including the drag generator associated with the back tensioning unit for multiplying the tension on the metal strip entering the back tensioning unit to obtain a metal elongating back tension on the metal strip leaving the back tensioning unit and entering the mill stand,

pivoting means supporting the back tensioning unit for limited pivotal movement around a vertical axis,

power means for pivotally moving the back tensioning unit about the vertical axis,

means between the back tensioning unit and the mill stand for indicating the location of the center line of the metal strip relative to the center line of the mill stand, and

means actuated by the last claimed means for activating the power means when the center of the metal strip tends to depart from the center line of the mill stand to cause the power means to pivotally move the back tensioning unit in the direction which will cause the center line of the metal strip to be maintained substantially on the center line of the mill stand.

4,086,690

METHOD AND APPARATUS FOR PRODUCING A ROTOR WELDED TOGETHER FROM DISCS

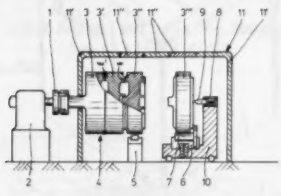
Felix Bernasconi, Zollikerberg, Switzerland, assignor to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Filed Apr. 27, 1976, Ser. No. 680,801

Claims priority, application Switzerland, Jun. 19, 1975, 7980/75

Int. Cl.² B23P *15/00*

U.S. Cl. 29—156.8 R **17 Claims**



1. A method for producing a rotor made from solid discs of materials which must be preheated for the purpose of welding and joined together in succession in side-by-side relation by welding within a common apparatus including an axially extendible enclosure which comprises the steps of assembling each rotor disc and the succeeding disc next to be joined thereto such that their axes are in horizontal alignment and the discs are interconnected by centrally located centering means, pressing the two discs together in an axial direction thereby to place their interfaces under pressure, preheating each two discs to be joined to the proper working temperature, joining each two discs by welding them together in a circumferentially extending welding seam while maintaining the axial pressure, axially extending the enclosure to accommodate successive discs, repeating said assembling, preheating, welding and enclosure extending operations disc-by-disc until all of the discs required to form the complete rotor have been welded together, heat-treating the completed rotor, and finally subjecting the completed rotor to a hot true-running test, all of said operations being performed within said common apparatus.

4,086,691

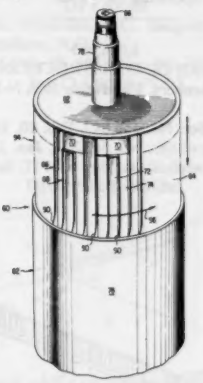
ROTARY HEAT EXCHANGERS

Horace L. Smith, Jr., Richmond, Va., assignor to Smitherm Industries, Inc., Richmond, Va.

Continuation-in-part of Ser. No. 622,612, Oct. 15, 1975, abandoned. This application Mar. 25, 1976, Ser. No. 670,114

Int. Cl.² B23P *15/26*

U.S. Cl. 29—157.3 R **3 Claims**



1. A method of upgrading the performance of a rotary dryer having a cylindrical outer shell, means for supplying steam to the dryer interior to heat said shell, and means for removing condensate from the interior of the dryer, said method comprising the steps of: removing from said shell the internal components of said dryer and installing in said shell an assembly which includes an inner shell and radially extending partition means fixed to said inner shell, said partition means being cooperable with said inner and outer shells to form independent, internested flow channels through which a heat transfer liquid can be circulated in counter flow relationship to heat said outer shell and to promote uniformity in the surface temperature of said shell.

4,086,692

APPARATUS FOR REMOVING A TAMPING TOOL FROM ITS HOLDER

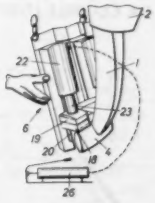
Josef Theurer, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industriegesellschaft G.m.b.H., Vienna, Austria

Filed Dec. 13, 1976, Ser. No. 749,884

Claims priority, application Austria, Feb. 4, 1976, 791/76

Int. Cl.² B23P *19/04*

U.S. Cl. 29—252 **9 Claims**



1. An apparatus for removing a tamping tool from a tool holder, the tamping tool having a shaft and a transversely extending tamping jaw at one end of the shaft, and the tool holder having a bore frictionally receiving the other shaft end, the tool holder forming part of a tamping head and the tamping tool jaw having an upper side facing an under side of the tool holder, the apparatus comprising a mechanism for moving the

tamping tool out of the tool holder bore, the mechanism including a frame comprising two cross members arranged to abut, respectively, the upper side of the tamping tool jaw and the under side of the tool holder, means for attachment of the frame to the tamping head, a pair of jacks mounted on the frame and arranged between the cross members to hold the tamping tool shaft substantially centered therebetween, and a power source for operating the jacks.

4,086,693

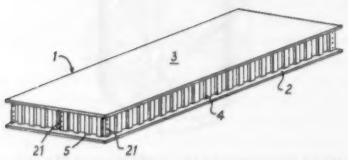
MANUFACTURE OF CONSTRUCTION ELEMENTS

Johan Caspar Falkenberg, Fjordveien 59 c, N-1322 Hovik, Norway

Continuation of Ser. No. 656,847, Feb. 10, 1976, abandoned, which is a division of Ser. No. 543,301, Jan. 23, 1975, Pat. No. 3,961,407. This application May 6, 1977, Ser. No. 794,657

Int. Cl.[2] B23P *11/00*

U.S. Cl. 29—432 **8 Claims**



1. A method of manufacturing a construction element of a predetermined length which includes a pair of spaced apart plates of nailable material and web strips having teeth along longitudinal edges thereof projecting into said plates for connecting them together, comprising the steps of providing elongated sheet metal web strips each of sinuous cross-section in a longitudinal direction and each of a first length in an untensioned condition, gripping the web strips at opposite ends thereof, moving said ends oppositely away from one another along said longitudinal direction until each of said strips has a second length in a tensioned condition greater than said first length, disposing said plates along said edges and perpendicular to said web strips, and while maintaining said strips in said tensioned condition, pressing said plates and said web strips together so as to embed said teeth into said plates.

4,086,694

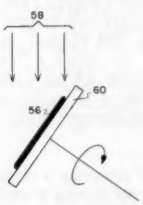
METHOD OF MAKING DIRECT METAL CONTACT TO BURIED LAYER

Aung San U, Rangoon, Burma, assignor to International Telephone & Telegraph Corporation, Nutley, N.J.

Division of Ser. No. 578,774, May 19, 1975, abandoned. This application Dec. 17, 1976, Ser. No. 752,214

Int. Cl.[2] B01J *17/00*

U.S. Cl. 29—579 **10 Claims**



1. A method of providing a direct metal contact to a buried region of a semiconductor device of the type wherein an intermediate layer is formed over said buried region, said intermediate layer having a first type conductivity and said buried region having a second type conductivity, comprising:

forming spaced regions of a first protective layer on said intermediate layer;

forming an opening in said intermediate layer using said spaced regions as a mask, thus exposing said buried region;

forming a second protective layer of dielectric material in said opening for coating said opening and said exposed buried region;

removing a portion of said second layer at the bottom of said opening for exposing said buried region, said step of removing comprising:

applying a negative photoresist to the surface of said second layer;

exposing said negative photoresist to a collimated beam of light at an angle of incidence such that the negative photoresist on said portion remains unexposed;

developing the exposed photoresist; and

removing said portion of said second layer beneath said unexposed negative photoresist; and

filling said opening with metal, said metal contacting the exposed buried region forming said direct contact.

4,086,695

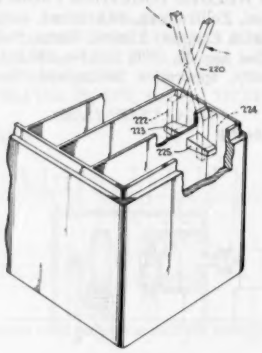
METHODS FOR THE IN-SITU CASTING OF INTER-CELL CONNECTORS

Earl B. Cornette, Brandon, and Laurence W. Hahn, Tampa, both of Fla., assignors to Chloride Conrex Corporation, Tampa, Fla.

Filed Sep. 12, 1974, Ser. No. 505,467

Int. Cl.[2] H01M *2/24*

U.S. Cl. 29—623.1 **10 Claims**



1. A method of assembling an electrical battery comprising the steps of:

a. providing a container having at least one partition to form at least two cells therein,

b. providing an aperture in said partition as required for inter-cell connection,

c. placing a group of plates into each cell, each group of plates having at least one plate of positive polarity and at least one plate of negative polarity,

d. forming a channel adjacent the plates of like polarity in each group of plates, a part of each plate of like polarity being exposed in its respective channel,

e. flowing molten metal only in the channels with said container in an upright position to join said parts of like polarity in each cell and through the aperture in the partition to form bus bars and an inter-cell connector,

f. applying compressive pressure to the bus bars on opposing sides of each inter-cell connector to cause an expansion of said inter-cell connector; and

said channels each include a tapered section adjacent to said

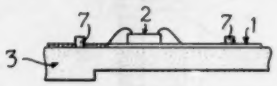
partition on opposite sides thereof and said pressure is applied to the tapered portion formed on said bus bars.

4,086,696

PACKAGING METHOD OF A CIRCUIT FOR AN ELECTRONIC WATCH

Yasuo Ikuta, Ichikawa, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed May 5, 1976, Ser. No. 683,619
Claims priority, application Japan, May 8, 1975, 50-55762
Int. Cl.[2] H01R *43/02*; H05K *3/32*
U.S. Cl. 29—627 **7 Claims**



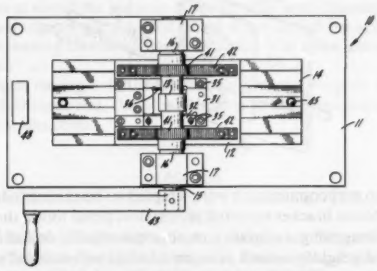
1. A method of manufacturing a circuit assembly for an electronic watch without use of a printed circuit board, comprising the steps of: providing a lead frame having a pattern of lead frame conductors, an IC chip having terminal pads for connection to other circuitry, and a base plate comprised of thermoplastic resin; bonding said IC chip to a surface portion of said lead frame; wire-bonding the IC chip terminal pads to respective lead frame conductors; superposing said lead frame on said base plate; melting preselected parts of the thermoplastic resin base plate while said lead frame is superposed thereon to thereby fix and connect together said lead frame and base plate as the melted parts harden; and potting with synthetic resin the IC chip and wire-bonded connections to effect sealing thereof thereby forming a circuit assembly for an electronic watch.

4,086,697

APPARATUS FOR MAKING WIRE TERMINATION ASSEMBLIES

Edward P. Brandeau, Willimantic, Conn., and John M. Gentry, Asheville, N.C., assignors to Akzona Incorporated, Asheville, N.C.

Filed Jun. 20, 1977, Ser. No. 808,064
Int. Cl.[2] H01R *43/04*
U.S. Cl. 29—749 **4 Claims**



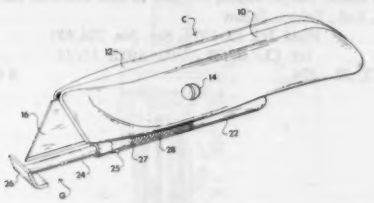
1. Apparatus for mechanically terminating a wire to a plate member having an open throated slot by applying force to the wire progressively from the open throat toward the slot, comprising, in combination, a frame, a carrier mounted on said frame for linear reciprocation, a roller journalled on said frame above said carrier, said carrier having stop portions for positively positioning a plate on said carrier, said roller having a radially projecting foot with an arcuate outer surface, means for coupling said roller and said carrier so as to maintain a predetermined angular position of the roller for every linear position of the carrier, and means for rotating said roller and reciprocating said carrier, said foot and said stop portions being positioned so that said outer surface applies progressive force to a wire over a slot in a plate when the plate is against said stop portions and the roller is rotated and the carrier is reciprocated.

4,086,698

SAFETY GUARD FOR THE BLADE OF CARTON OPENERS

William F. Sparks, Stoneville, N.C., assignor to Macfield Texturing, Inc., Madison, N.C.

Filed Feb. 28, 1977, Ser. No. 772,584
Int. Cl.[2] B26B *29/02*
U.S. Cl. 30—2 **2 Claims**



1. In combination with a carton cutter of the type having a handle formed of complimentary sides and a cutting blade disposed between said sides and protruding longitudinally from one end of said handle a prescribed distance, an improved cutter guard comprising:

(a) a guard means attached to said handle and including a shoe movable in a longitudinal path between an extended, safe position wherein said shoe protrudes from said handle a distance at least as great as said prescribed distance and closely adjacent to the tip end of said blade and a second, retracted position in which said blade tip is exposed, said movement of the guard means from said first to said second position being responsive to initiation of a cutting action by said blade against a given surface;

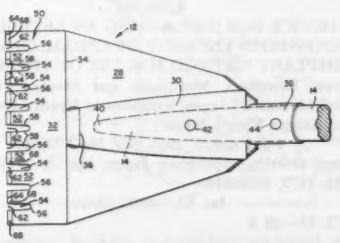
(b) said longitudinal path of said guard means being parallel to and closely adjacent the exposed sharp edge of said blade with said shoe preceding said blade during a cutting stroke.

4,086,699

ROOF STRIPPING TOOL

E. Alfred Olkkola, 24 Wilson Rd., West Yarmouth, Mass. 02673

Continuation-in-part of Ser. No. 593,796, Jul. 7, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,493
Int. Cl.[2] A47L *13/02*
U.S. Cl. 30—172 **9 Claims**



1. A roofing tool for use in stripping shingles from the roof of a building comprising: a blade member and a handle for the blade member, wherein the forward portion of the blade member is turned upwardly relative to the body portion, the central portion of the body portion lying in a horizontal plane and the

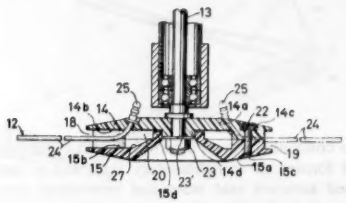
rear portion thereof turned upwardly forming a shoulder on which the tool is rocked to raise and lower the forward portion during use, the forward portion of the blade member being substantially rectangular and provided with a plurality of relatively short spaced teeth defining therebetween a plurality of slots, the leading edges of the teeth being flat and the entrance portions of the slots being relatively wide and tapered inwardly to rounded inner ends for catching and pulling nails during use of the tool.

4,086,700

CUTTING HEAD FOR A MOWER

Kiichi Inada, Tokyo, Japan, assignor to Elta Machine Industrial Co., Ltd., Tokyo, Japan

Filed Jul. 13, 1976, Ser. No. 704,931
Int. Cl.[2] B26B *27/00*; A01D *55/18*
U.S. Cl. 30—276 **4 Claims**



1. A cutter for a lawn mower comprising: a rotating disc for mounting on a driving mechanism, said disc having a cavity therein and two openings at diametrically opposite points in the periphery of the disc and opening out of the disc from the cavity, a guide member on the opposite side of each opening and each pair of opposed guide members defining the opening therebetween, and said disc having holes therein inclined outwardly from a surface of the disc other than the periphery and extending into the cavity, one hole being provided adjacent each of said openings; and a plurality of flexible wire-shaped cutting members, each having a wire-shaped portion of a flexible material and a stop on one end thereof, said stop being of an elastic material harder than the material of the wire-shaped portion and having a flange thereon larger than said inclined holes, said wire-shaped portions of said cutting members extending through said inclined holes and through said cavity and out through said openings and projecting beyond the periphery of said disc, with said flanges against the surface of the disc from which said holes extend for preventing the cutting members from being flung outwardly of the disc during rotation thereof.

4,086,701

DEVICE FOR IMPLANTING AN ARTIFICIAL ENDOSSEOUS ELEMENT OF CERAMICS AND AN IMPLANT METHOD FOR USE OF THE SAME

Haruyuki Kawahara, Moriguchi, and Masaya Hirabayashi, Yokaichi, both of Japan, assignors to Kyoto Ceramic Kabushiki Kaisha, Kyoto, Japan

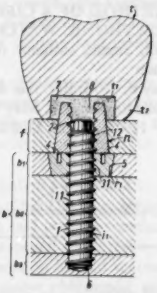
Filed Apr. 7, 1976, Ser. No. 674,688
Claims priority, application Japan, Apr. 7, 1975, 50-42664; Apr. 16, 1975, 50-46814
Int. Cl.[2] A61C *13/22*
U.S. Cl. 32—10 A **8 Claims**

1. A device for implanting an artificial endosseous element into a bone tissue consisting of:

an implant screw pin;

a flange member in combination with said pin for securely holding said pin, said pin having external threads on the circumference of a main portion thereof to be screwed directly into the bone tissue, said main portion is adapted to be a main screw portion and being provided with a tool-attaching portion at the top of said main portion;

said flange member being of burnt ceramics and being anchored in association with said pin into a facing shoulder recessed around said pin, said facing shoulder is predeterminately provided in a hard tissue of the bone, thereby holding said pin tightly in said bone tissue.

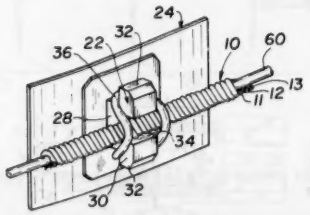


4,086,702

MULTI-STRANDED COILED ORTHODONTIC ARCH WIRE

Melvin Wallshein, 8645 Bay Pkwy., Brooklyn, N.Y. 11214

Filed Jul. 26, 1976, Ser. No. 708,304
Int. Cl.[2] A61C *7/00*
U.S. Cl. 32—14 A **51 Claims**



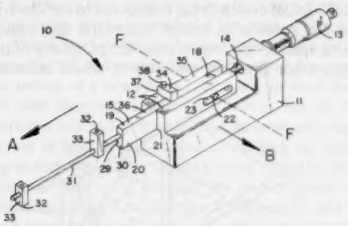
1. An orthodontic arch wire adapted to be connected to an orthodontic bracket mounted on a malocclueded tooth, the arch wire comprising a plurality of adjacent strands coiled in the form of a tightly wound elongated coiled wire normally having an array of interleaved turns of and generally parallel, and having a lumen extending therethrough, said strands when formed into said turns having a predetermined radial thickness (*t*), said turns having a common internal dimension (*d*-FIG. 2; *s*1-FIG. 9) of said lumen no greater than two times said predetermined radial thickness (*t*) of said strands and having a common outer dimension no greater than approximately 0.025 inches, said strands being made from a material sufficiently elastic to at least permit bending of the arch wire over a short length thereof by selectively and at least partially separating adjacent turns, and to provide sufficient stiffness over a long length to provide adequate anchoring characteristics for orthodontic devices attached thereto.

4,086,703

MICROMETER GAUGE

Aubrey Gene Roberts, 10500 Westminster Ave., #34, Garden Grove, Calif. 92643

Filed Aug. 20, 1976, Ser. No. 716,199
Int. Cl.[2] G01B 3/18
U.S. Cl. 33—164 R 5 Claims



1. A gauge, comprising:
a body having an arm channel and a slot having a length in a first direction;
a rest coupled to the body;
a guide coupled to the body defining a first direction;
a micrometer head having a micrometer rod coupled to the body so that the micrometer rod moves in substantially the same direction as the first direction;
an arm having a front portion, a rear portion and a side slidably coupled to the guide and coupled to the micrometer rod, the arm slidable in the first direction, the rear portion being pivotably coupled to the body, wherein the arm rests on the rest, the arm further having a curved rear end which butts against the micrometer rod of the micrometer head, the arm further having a front end having a flat surface;
a pin having a pin axis extending from the side of the arm from the rear portion of the arm, wherein the pin axis is in a second direction which is substantially perpendicular to the first direction, wherein the height of the slot of the body is slightly larger than the height of the pin, wherein the pin is positioned in the slot allowing the pin to move in the first direction and allowing the front portion of the arm to pivot up about the pin axis wherein the arm channel of the body is under the rear portion of the arm and is capable of allowing part of the rear portion of the arm to pivot about the pin axis down into the arm channel;
an adjustment rod coupled to the front end of the arm and extending therefrom in the direction of the first direction; and
a block having a flat front surface slidably coupled to the adjustment rod, the block slidable in the direction of the first direction.

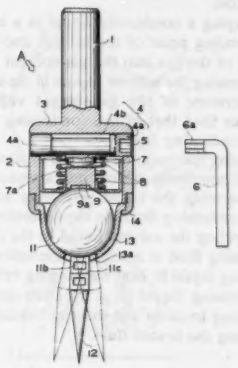
4,086,704

COMBINATION TOOL MOUNT AND CENTERING DEVICE

Sato Masaichi, Fujinomiya, Japan, assignor to Yugen Kaisha Sato Seimitsu Kanagata Seisakusho, Fujinomiya, Japan

Filed Jan. 28, 1977, Ser. No. 763,537
Claims priority, application Japan, Feb. 24, 1976, 51-114514
Int. Cl.[2] G01B 3/22
U.S. Cl. 33—169 C 11 Claims

1. A combination tool mount and centering device, comprising:
a socket having a mounting shaft extending from the closed end thereof for mounting in the spindle of a machine tool;
an eccentric shaft rotatably mounted in the inner end of said socket for rotation around an axis transverse to the axis of said socket, said eccentric shaft being rotatable from outside of said socket;
a movable piece in said socket engaged with said eccentric shaft and movable in the direction of the axis of said socket by the rotation of said shaft;
a sphere in said socket and having the spherical surface thereof engaged by said pressing piece;
a semispherical cover over the open end of said socket against which the spherical surface of said sphere is engaged for holding said sphere in said socket;
a centering needle removably mounted on said sphere, said semispherical cover having an aperture therein through which said centering needle projects; and



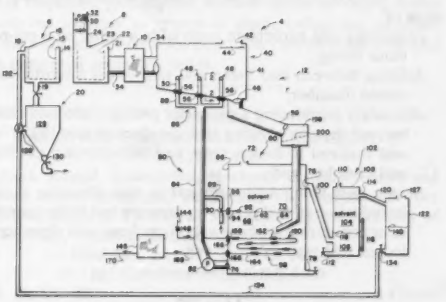
a pressing piece mounted in said socket between said movable piece and said sphere for movement in the direction of the axis of said socket;
one of said pieces having a spherical surface thereon projecting toward the other piece and engaging said other piece when said eccentric shaft is in a position toward said sphere for pressing said sphere into frictional locking engagement with said cover; and
a resilient means between said movable piece and said pressing piece and urging them away from each other when said eccentric shaft is in a position away from said sphere.

4,086,705

DRY CLEANING SYSTEM WITH SOLVENT RECOVERY

Robert L. Wehr, 5893 Sunset Dr., Hudson, Ohio 44236

Filed Apr. 1, 1977, Ser. No. 783,683
Int. Cl.[2] F26B 3/00
U.S. Cl. 34—26 19 Claims



9. A dry cleaning process incorporating a solvent recovery technique, comprising:
(a) steps for cleaning soiled fabrics with a petroleum solvent which is liquid at atmospheric temperature and pressure, including:
(i) agitating the soiled fabrics and liquid petroleum solvent

in a dry cleaning unit to transfer contaminants from the fabric to the solvent; then

(ii) extracting the liquid petroleum solvent; then

(iii) drying the fabrics including passing a gas having a low boiling point through and around the fabrics at a temperature sufficiently high to vaporize the petroleum solvent remaining on the fabric and produce a gas-solvent vapor mixture; and,

(b) steps for recovering solvent from the gas-solvent vapor mixture, including:

(i) admitting the gas-solvent vapor mixture to a spray chamber;

(ii) spraying a condensing liquid at a temperature below the boiling point of the solvent and above the boiling point of the gas into the gas-solvent vapor mixture for condensing the solvent vapors in the spray chamber, the temperature of the gas-solvent vapor mixture being greater than that of the condensing liquid for heating the condensing liquid;

(iii) passing the resulting mixture of condensing liquid and liquid petroleum solvent into a separator;

(iv) separating the liquid petroleum solvent liquid from the condensing liquid in the separator;

(v) recycling the solvent liquid to the dry cleaning unit;

(vi) passing fluid at a temperature below that of the condensing liquid in heat exchanging relationship with the condensing liquid at a location downstream of the spraying location and thereby heating the fluid; and,

(vii) using the heated fluid.

4,086,706

FEEDING AND TREATING SYSTEM

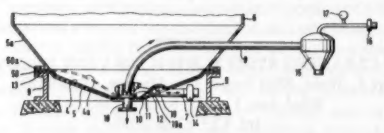
Adolf Lesk, and Wolfgang Hageleit, both of Osterburken, Germany, assignors to Ingenieur-Büro Margarete Lesk, Osterburken, Germany

Division of Ser. No. 667,822, Mar. 17, 1976, Pat. No. 4,009,393. This application Sep. 15, 1976, Ser. No. 723,648

Claims priority, application Germany, Mar. 19, 1975, 2511996; Jan. 23, 1976, 2602486

Int. Cl.[2] F26B *7/00*

U.S. Cl. 34—33 **4 Claims**



1. A method of treating particulate material comprising the steps of:

supporting said particulate material in a vessel on a gas-pervious lining;

defining between said lining and said vessel a substantially closed chamber;

alternately introducing a gas under pressure into said chamber and thereby blowing said gas through said lining into said material to loosen same and withdrawing gas from said chamber; and

flexing said lining with said gas in one direction during introduction of said gas under pressure and in the opposite direction during withdrawal of gas from said chamber to loosen said material.

4,086,707

CLOTHES DRYER MACHINE AND METHOD

John Bochan, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Nov. 1, 1976, Ser. No. 737,834

Int. Cl.[2] F26B *19/00*

U.S. Cl. 34—48 **5 Claims**

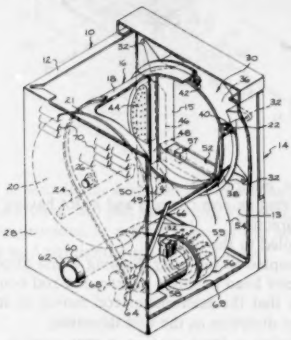
1. In an automatic clothes dryer having a rotatable drum, means to heat air, and means driven by a single speed electric motor for circulating the heated air through the drum, the improvement comprising:

(a) temperature sensing means for sensing a predetermined selected temperature of the air exiting the drum,

(b) means to reduce the temperature at which the air is heated upon reaching the selected predetermined temperature,

(c) a cylindrical clutch drum connected to the electric motor shaft for rotation in unison therewith, said clutch drum having spaced openings around the periphery of the drum,

(d) a governor slip shoe and blower wheel assembly rotatably secured to the motor shaft for relative movement therewith, said governor slip shoe being arranged to engage the clutch drum periphery with variable frictional force,



(e) a plunger assembly secured to the governor slip shoe and blower assembly and rotatable in unison therewith, said plunger being operable to engage the clutch drum through the openings around the periphery and be withdrawn from engagement with the clutch drum, and

(f) means responsive to the selected predetermined temperature to withdraw the plunger from the openings whereby the governor slip shoe and blower wheel assembly will rotate at less speed than the clutch drum.

4,086,708

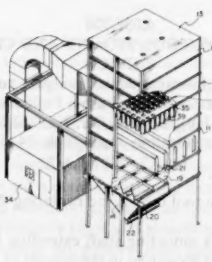
GRAIN DRYER

Christianus M. T. Westelaken, St. Marys, Canada, assignor to Westlake Agricultural Engineering Inc., St. Marys, Canada

Continuation-in-part of Ser. No. 601,867, Aug. 4, 1975, abandoned. This application Feb. 18, 1977, Ser. No. 770,048

Int. Cl.[2] F26B *7/00*

U.S. Cl. 34—65 **13 Claims**



1. A concurrent-countercurrent flow grain dryer comprising a tower with side walls, a top and a bottom, said tower having a wet grain receiving bin at the top, said bin having a horizontal floor assembly extending across between the side walls of

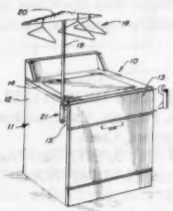
the tower, said floor assembly having a plurality of substantially uniformly spaced openings extending over substantially the entire floor assembly with a wet grain delivery tube member fixed beneath each said opening, the tube members having substantially uniform transverse dimensions and being spaced from each other a distance no greater than twice the said transverse dimensions and serving to deliver wet grain in response to gravity from said receiving bin into a drying chamber located in the tower beneath the bin, said drying chamber having a plurality of grain discharge outlets extending across the bottom thereof and means for withdrawing dry grain from said grain outlets at a controlled rate, a hot air inlet duct adjacent said tube members adapted to deliver hot air into the spaces between said tube members and downwardly through a bed of grain in said drying chamber, cooling air inlet ducts extending across the bottom of said drying chamber for directing cooling air upwardly through the bed of grain, exhaust ducts extending across said chamber intermediate said hot and cooling air inlet ducts to receive and exhaust air flowing from said hot inlet duct in a concurrent direction to grain flow and to receive and exhaust cooling air flowing from said cooling air inlet ducts in a countercurrent direction to grain flow, and means for providing hot air to said hot air inlet duct and cooling air to said cooling air inlet ducts, said tube members being of a size and spacing from each other such that the wet grain is delivered through the tube members into the drying chamber with a pulsating action and the wet grain flowing into the drying chamber forms a layer over the entire area between the tube members during each pulsation.

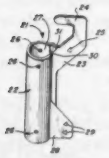
4,086,709

HOLDER FOR CLOTHES HANGER ON DRIER

William Andrew Jackson, Hartford, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Nov. 19, 1976, Ser. No. 743,465
Int. Cl.[2] F26B *19/00*
U.S. Cl. 34—90 **9 Claims**





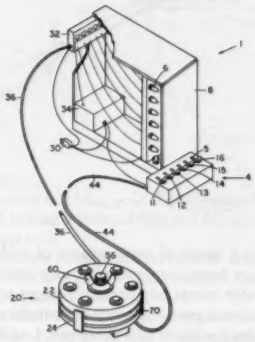
1. In an appliance having a cabinet provided with a plurality of outer panels cooperatively defining a vertical slit and an inwardly projecting flange at the top of the slit, improved mounting means for supporting an upright member having means for removably carrying a hanger, said mounting means comprising a carrier having split tubular support means for removably carrying the upright member, a first thin wall portion extending from one longitudinal split edge of said carrier support means and defining a returned hook portion constructed to be passed through said slit to hook onto said cabinet flange for supporting the carrier on the cabinet and a second thin wall portion extending from the other longitudinal split edge of said carrier support means and substantially coplanarly of said first thin wall portion to be received in said slit for stabilizing the carrier on said cabinet.

4,086,710

BRAIN DAMAGE TESTING

James F. Craine, 116 Kaapuni Dr., Kailua, Hi. 96734

Filed Oct. 25, 1973, Ser. No. 409,660
Int. Cl.[2] G09B *19/00*
U.S. Cl. 35—22 R **10 Claims**



1. Intelligence testing apparatus comprising a collection of response means which are readily ascertainable varied responses which are distinguishable one from the other for individually producing unique sensory perceptions in a subject being tested, an array of controllers positioned before the subject, the controllers being severally and operably connected to the response means for controlling operation of individual response means upon operating corresponding controllers, and sequence shifting means for changing relationships of the controllers and the response means while maintaining a uniform linear sequence relationship of response to controllers, controller (1) controlling response A, controller (2) controlling response B, (3) controlling C . . . , $n-2$ controlling X, $n-1$ controlling Y, controller "n" controlling response Z before operation of the shifting means, and controller 1 controlling response Y, controller (2) controlling response Z, (3) controlling A, (4) controlling B, 5 controlling C, . . . controller n controlling response X, after shifting, wherein the response means are indicators selected from the group of readily ascertainable responses consisting of varied audible tones, selectively displayed pictures and electric lamps of varied colors connected together in groups of single colors and mounted within a box and wherein the controllers are switches arranged in a sequential geometric order.

4,086,711

LASER HIT INDICATOR USING REFLECTIVE MATERIALS

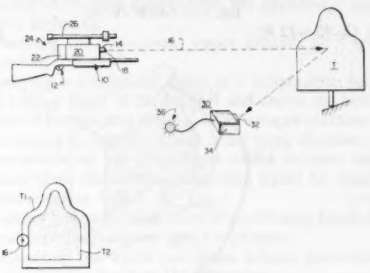
Rudolph Ronald Gammarino, Hacienda Heights, Calif., and John James Theologos, Ft. Eustis, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 14, 1977, Ser. No. 768,115
Int. Cl.[2] F41J *5/02*; G09B *9/00*
U.S. Cl. 35—25 **4 Claims**

1. A marksmanship training system comprising:
weapon means having a bore-sighted laser means thereon for emitting a focussed beam of laser energy to the aiming point of the weapon means in response to selective actuation of the weapon means to simulate firing thereof;
target means downrange from said weapon means for impingement by said beam in response to correct aiming and simulated firing of said weapon means, said target means

including a hit area on the obverse surface covered with a light scattering reflective material, said hit area being a lesser including area of said obverse surface of said target means;

hit detector means adjacent to said target means responsive to a predetermined level of laser energy reflected there-



from as a result of impingement of said target means by said laser beam for generating an output signal; and

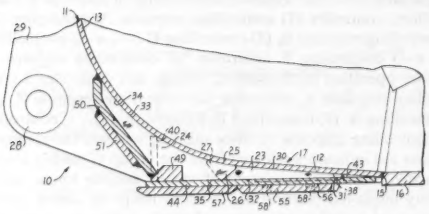
hit indicator means adjacent said target means actuated by said output signal to provide an indication of said impingement discernible at said firing point, said hit detector and hit indicator means being mounted on said target means adjacent said obverse surface.

4,086,712

BUCKET CONSTRUCTION HAVING IMPROVED REINFORCING MEANS

Charles P. McReynolds, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 31, 1977, Ser. No. 783,101
Int. Cl.[2] E02F *3/70*
U.S. Cl. 37—118 A **19 Claims**



1. In a material handling bucket structure having a relatively thin shell defining a bottom wall having a front edge portion and an upturned rear portion, and defining an underside, and a blade secured to said front edge portion to project forwardly therefrom, improved reinforcing and mounting means comprising:

first and second generally straight longitudinal ribs secured to the underside of the shell, said ribs being spaced transversely of the shell, each rib extending from adjacent said front edge portion rearwardly to said rear portion and having a front rectilinear portion and a rear rectilinear portion;

third and fourth outer ribs secured to the underside of the shell, said third and fourth ribs extending forwardly and transversely outwardly from said rear portion of said first and second ribs respectively to adjacent said front edge portion of the shell; and

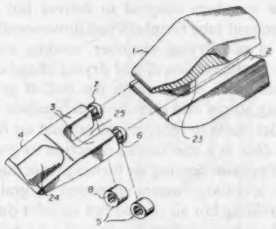
a paddle plate spaced below said shell and secured to said ribs to define therewith and said shell a box section extending rearwardly from said blade to rearwardly of said third and fourth ribs and the front portion of said first and second ribs.

4,086,713

DIGGER TOOTH RETAINER

Kenneth M. White, Calgary, Canada, assignor to Western Rock Bit Co., Ltd., Calgary, Canada

Filed Jan. 10, 1977, Ser. No. 758,356
Claims priority, application Canada, May 27, 1976, 253465
Int. Cl.[2] E02F *9/28*
U.S. Cl. 37—142 A **3 Claims**



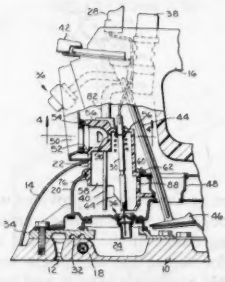
1. The combination of a digger tooth, a digger tooth holder, and a digger tooth retaining means; said holder incorporating two spaced recesses; said tooth comprising a tip portion adapted for excavating and a shank portion adapted for co-acting with said holder; said shank portion comprising two shanks separated by a generally rectangular slot; said shanks each being receivable in one of said recesses; said retaining means comprising two resilient collars, each having an inner surface adapted for co-acting with one of said shanks and a peripheral surface adapted for co-acting with the walls of one of said recesses; said peripheral surfaces being eccentrically displaced with respect to said inner surfaces; the inner surfaces of the retaining means and co-acting surfaces of the shanks having complementary regular polygonal shapes.

4,086,714

STEAM IRON BAFFLING

James P. Coggiola, Pomona, Calif., assignor to General Electric Company, Bridgeport, Conn.

Filed May 5, 1977, Ser. No. 793,922
Int. Cl.[2] D06F *75/06, 75/18*
U.S. Cl. 38—77.82 **6 Claims**



1. In a steam iron having an enclosed water tank in a shell under connected handle structure and a ported soleplate for steam passage, a water valve assembly opening and a walled thermostat control means opening through said tank, a water fill opening in the forward handle portion, and, a riser tube connecting the fill and valve assembly openings, the improvement in said riser tube comprising,

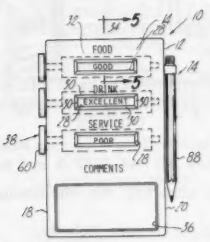
a substantially cylindrical integral plastic member having an outer flange therearound to rest on said tank with the tube extending into said tank around said flange,
a forward cutout portion of said tube within said tank, the rear tube portion forming a baffle in said tank,
a top wall closing the upper end of said tube,
a forward extension below the top wall and connected to said fill opening,
apertured baffle means in said tube behind said extension,
a series of openings in said top wall for selective use thereof, and
operable stem means in one of said openings connected to the water valve,
whereby a single integral plastic riser tube functions for filling the iron, acting as a baffle in the tank and in said tube, and is selectively usable through said openings for different iron features.

4,086,715

MULTIPLE RATING DEVICE

Quentin P. Blonigen, 707 N. Mill St., Clio, Mich. 48420

Filed Apr. 21, 1976, Ser. No. 679,014
Int. Cl.[2] G09F 9/40
U.S. Cl. 40—504 **6 Claims**



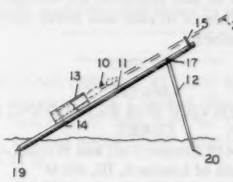
1. A multiple use rating device, comprising:
(a) a separable housing having an open interior, the housing being defined by a front panel, a rear panel, a pair of opposed side panels, a top panel and a bottom panel,
(b) a yieldable viewing opening provided in the front panel, the edges of the panel about the opening being yieldable and defining a detent,
(c) a first set of indicia provided on the front panel proximate the viewing opening,
(d) a shaft traversing the housing and disposed interiorly thereof, the shaft having one end thereof seated in a housing formed on the interior of one side panel, the other end of the shaft extending through an opposed housing formed on the other side panel, the other end of the shaft extending exteriorly of the device,
(e) a rotatable drum mounted on the shaft, the drum having a plurality of raised portions, each raised portion being registerable with the viewing opening, the raised portions being circumferentiallydisposed around the drum, the raised portions being fixed in position by the detent,
(f) a second set of indicia provided on each of the raised portions, the second set of indicia being correlated to the first set of indicia,
(g) means for detachably securing a writing implement to the device, and
(h) means for rotating the shaft mounted onto the other end of the shaft exteriorly of the housing.

4,086,716

FISHING POLE TRIPOD

Richard W. Donahue, 2707 Penna. Ave. West, Warren, Pa. 16365

Filed Sep. 20, 1976, Ser. No. 725,019
Int. Cl.[2] A01K 97/10
U.S. Cl. 43—21.2 **1 Claim**



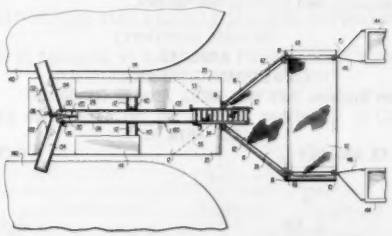
1. In combination,
a fishing pole and a fishing pole tripod comprising,
a support rod having a pointed first end for ground insertion and a second end,
a U-shaped member having an intermediate member and legs extending from said intermediate member and terminating in points for ground insertion,
a first hole in said support rod adjacent said second end,
said intermediate member of said U-shaped member extending through said first hole and swingably supporting said leg members on said support rod whereby said leg members may swing to a position generally perpendicular to said support rod and to a position parallel to said support rod with said rod support rod between said legs of said U-shaped member and co-planar therewith,
a tubular rod handle holder fixed to said support rod adjacent the first end thereof,
a U-shaped front clevis extending through a second hole at said second end in said support rod and having upwardly extending legs extending generally perpendicular to said support rod at a position spaced from said leg members,
a fishing rod having a handle received in said rod handle holder,
said fishing rod resting in said front clevis.

4,086,717

FISH HANDLING APPARATUS

Ano J. Aucoin, Jr., and Rodney Hanks, both of 213 Utah St., Morgan City, La. 70380

Filed Jul. 2, 1976, Ser. No. 702,101
Int. Cl.[2] A01K 79/00
U.S. Cl. 43—6.5 **8 Claims**



1. Fishing apparatus comprising:
a floatable platform;
a transfer conveyor mounted at a forward end of said platform and extending downwardly and forwardly therefrom;
forwardly extending, laterally spaced support arms pivotably connected adjacent the forward end of said platform for up and down swinging movement;

laterally spaced pontoons secured to forward ends of said support arms, said pontoons each including an inner chamber;

net means forming a forwardly open scoop extending from said pontoons to said transfer conveyor for capturing fish and conducting such fish upwardly toward a mouth of said transfer conveyor; and

means connected to said pontoons for selectively varying the buoyancy thereof to raise and lower said scoop relative to said platform.

4,086,718

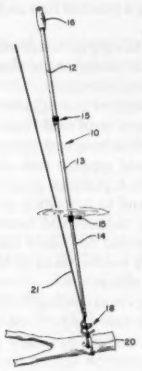
TELESCOPING DEVICE FOR RETRIEVING FISHING LURES

Robert L. Swanson, 619 Kramer Ave., and William J. Blake, 173 E. North Ave., both of Lombard, Ill. 60148

Filed Nov. 8, 1976, Ser. No. 739,829

Int. Cl.[2] A01K *97/00*

U.S. Cl. 43—17.2 **4 Claims**



1. A lure retriever comprising:

a pole unit;

a lure-engaging snare;

a shank on said snare;

a tubular adaptor having an inner diameter greater than the outer diameter of said shank;

means on the periphery of said shank, and integral therewith, for effecting a force fit of said shank within said adaptor;

said pole unit comprising a tube having a terminal end;

and means on the outer periphery of said adaptor, and integral therewith, for locking said adaptor inside said tube adjacent said terminal end thereof.

4,086,719

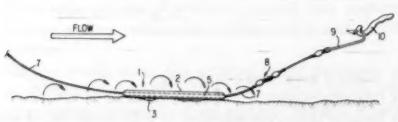
FISHING SINKER

Robert Robbins, P.O. Box 20202, Atlanta, Ga. 30325

Filed Apr. 19, 1976, Ser. No. 678,118

Int. Cl.[2] A01K *95/00*

U.S. Cl. 43—44.9 **6 Claims**



1. A sinker for holding down a running fishing line in bodies of water in which there is a current, said sinker comprising:

an elongated relatively flat body of heavy material having a length which is at least 4 times the thickness thereof and a width which is at least two and one-half times the thickness thereof;

said elongated body being defined by oppositely disposed generally planar flank areas and continuous side edges and including a centered longitudinal bore therethrough through which the running fishing line passes, wherein when the sinker rests on a bottom of a body of water, eddy currents created by the current flowing over the sinker in cooperation with slippage of the running line stabilizes the sinker so that the sinker is not moved by slight forces on the running line.

4,086,720

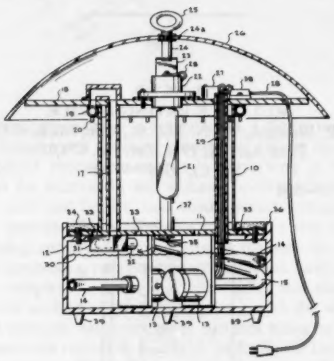
DEVICE FOR ATTRACTING AND ELIMINATING FLYING INSECTS

John A. Wiser, P.O. Box 192, Liberty, Tex. 77575

Filed Oct. 18, 1976, Ser. No. 733,538

Int. Cl.[2] A01M *1/04*

U.S. Cl. 43—113 **3 Claims**



1. A device for attracting and eliminating flying insects comprising:

a cylindrical clear or translucent body,

a light source mounted within said body for attracting insects,

a tube mounted about the upper periphery external of said body and extending beyond said body, said tube having a plurality of openings thereon and spaced about the body,

a liquid reservoir, said body being substantially centrally mounted to the liquid reservoir on a surface extending laterally beyond said body and said tube, said surface having an opening thereon into said reservoir, said openings in said tube being positioned to allow liquid to fall therefrom on to said laterally extending surface,

a pump means located within said reservoir,

a conduit connected to said pump means and to said tube for carrying pumped liquid from said reservoir to said tube,

said light source and pump means being electric,

means for supplying electricity to said light source and pump means, and

a safety means being connected in series to said light source and pump means for deactivating an electric circuit when the horizontal position of said device is changed a predetermined amount in any direction.

4,086,721

ILLUMINATED INSECT TRAP HAVING SINGLE TRANSPARENT PLATE

Warren Deas, General Delivery, Bladon Springs, Ala. 36902

Filed Oct. 13, 1976, Ser. No. 731,667

Int. Cl.[2] A01M *1/04*

U.S. Cl. 43—113 **6 Claims**

1. An insect trap comprising: container a bottom plate and a

plurality of walls forming a rectangular container for providing a reservoir for a liquid and insects; a plurality of legs extending from said base for supporting same; a transparent plate extending continuously along a center line of said container from a first wall to a second wall opposite said first wall across said reservoir and means for mounting said plate on the walls of said container above said reservoir with said reservoir ex-

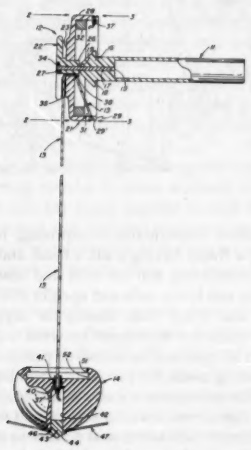
tending laterally from both sides of said plate; support posts extending upwardly from said container; a top mounted on said support post above said transparent plate; and light means mounted on said top; said bottom plate including means for draining said reservoir; and the space between said container and said top on either side of said transparent plate being open to permit insects to fly therebetween.

4,086,722

SPINABLE OBJECT ON A LENGTH-ADJUSTABLE TETHER DETACHABLY SECURED TO A ROTATABLE BOBBIN

Paul L. Brown, 982 Lakeview Way, Redwood City, Calif. 94062

Filed Jun. 8, 1977, Ser. No. 804,615
Int. Cl.[2] A63H *27/12*
U.S. Cl. 46—61 **5 Claims**



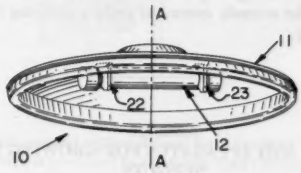
1. In a flight controlled toy including a manipulatable handle, a bobbin rotatably mounted on said handle, a spinnable object, and a tether secured by a first knot at one end thereof to said bobbin and by a second knot at its other end to said object for enabling orbital movement thereof in relation to said handle and rotational movement thereof on a level surface, means for adjusting the length of said tether to vary the distance beetween said object and said bobbin to accommodate for different lengths of arms of persons playing with the toy, said means comprising a rearwardly projecting annular rim section on said bobbin having a recessed periphery thereon about which a portion of said tether is windable and retainable and also having a plurality of slits therein arranged at unequal distances apart on said periphery for selectively passing the adjacent portion of the extremty of said tether with said first knot engaged with the inner wall of said annular rim section thereby variably anchoring said tether to said bobbin.

4,086,723

CHEMI-LUMINESCENT FLYING SAUCER TOY

Raymond L. Strawick, 52 N. Lynwood, Phoenix, Ariz. 85003

Filed Sep. 29, 1976, Ser. No. 727,782
Int. Cl.[2] A63H *27/00*; A63B *65/00*
U.S. Cl. 46—74 D **3 Claims**



1. An illuminated aerodynamic toy comprising in combination:

a circular disc made of a moldable plastic material including a generally flat circular central portion having two opposing sides thereto;

an annular rim surrounding said central portion and integrally formed therewith, said rim extending symmetrically outwardly of the plane of said central portion,

said central portion and rim including a convex surface on one side of said central portion and defining an outer side of said disc, and a concave surface on the opposing side of said central portion and defining an inner side of said disc;

a pair of bifurcated members extending from said inner side of said disc and positioned in equally spaced relation to an axis thereof extending perpendicularly to the plane of said central portion; and

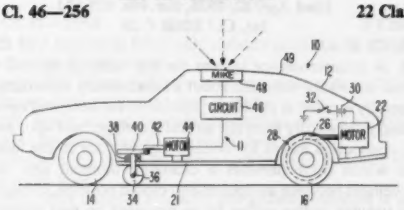
a self-contained device for providing chemiluminescent light and adapted for fastening to said pair of bifurcated members, said device having an outer flexible, cylindrical, light transmitting container for one reactive composition, and an inner rigid, brittle container for another reactive composition.

4,086,724

MOTORIZED TOY VEHICLE HAVING IMPROVED CONTROL MEANS

Robert E. McCaslin, 81 Anchor Dr., Pittsburg, Calif. 94565

Filed Jan. 16, 1976, Ser. No. 648,831
Int. Cl.[2] A63H *29/22*
U.S. Cl. 46—256 **22 Claims**



1. A toy vehicle comprising: a support; means mounted on the support for permitting the latter to move along a medium;

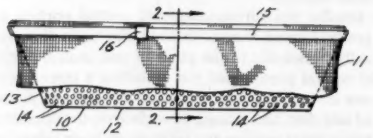
a steering member independent of said permitting means for engaging the medium along which the support is to be moved, said member having means mounted on the support for rotation about a generally vertical axis for movement through an arc of 360° and being rotatable into and out of any one of a plurality of operative positions relative to the support; a motor responsive to signals applied thereto and having a drive shaft rotatable in one direction; means coupling said drive shaft to said steering member for rotating the latter relative to said support as a function only of the duration of the signal applied to said motor, whereby the member will move from one operative position to another operative position with the two positions being separated by an arcuate distance corresponding in length to the period in which the motor is actuated; and means mounted in a fixed position on the support and responsive to an acoustic command emanating from a location remote from said support for providing a signal corresponding in duration to the duration of the acoustic command and for applying the signal to said motor.

4,086,725

METHOD AND APPARATUS FOR GROWING PLANT SPROUTS

Tsiang Kwang Li, 66 Lakewood Ave., Ho-Ho-Kus, N.J. 07423

Filed Jun. 25, 1976, Ser. No. 699,878
Int. Cl.[2] A01G *31/00*
U.S. Cl. 47—61 **29 Claims**



1. Apparatus for growing plant sprouts comprising (1) a container having an open top, a sidewall and a perforated bottom, and (2) flexible means held in contiguous relationship with said sidewall and providing a longitudinal extension thereof and being adapted to restrain expansion of the plant sprouts during the plant sprout growing period, said means being adjustable to permit the restraint on the sprouts to be varied.

4,086,726

AIRCRAFT DOOR COUNTERBALANCE SYSTEM

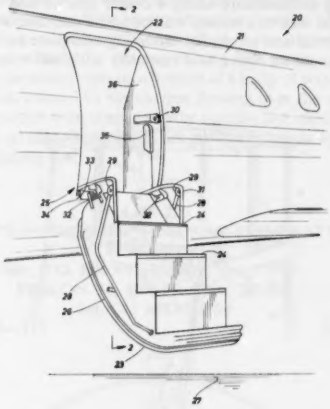
Brian Keith Moses, Dallas, Tex., assignor to The BKM Company, Dallas, Tex.

Filed Apr. 22, 1976, Ser. No. 679,173
Int. Cl.[2] E06B *7/28*
U.S. Cl. 49—37 **12 Claims**

1. A counterbalance system for use with an aircraft door which is rotably mounted about a substantially horizontal axis generally located at the lower portion of the door and opens by swingly outwardly from the aircraft fuselage, said door including connection means for connecting the door to the fuselage, and which door presents a changing moment arm during movement between an opened and closed position, comprising:

a varying radius pulley to be mounted on said connection means and which rotates about a substantially horizontal axis upon movement of the door between an opened and closed position; and

means to apply a substantially uniform force on the periphery of said pulley to exert a moment on said pulley opposite the moment exerted by said door, to counterbalance



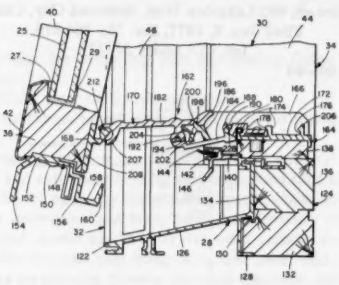
forces imposed by the door as it is moved between an opened and closed position.

4,086,727

PIVOT WINDOW CONSTRUCTION

Herman S. Kuyper, Knoxville; Tad B. Anthony, and Robert S. Evers, both of Pella, all of Iowa, assignors to Rolscreen Company, Pella, Iowa

Filed Jan. 29, 1976, Ser. No. 653,306
Int. Cl.[2] E05F *7/02*
U.S. Cl. 49—255 **24 Claims**



1. A window construction comprising, in combination, a fixed window frame having a sill, a head, and a pair of upright jambs interconnecting said sill with said head, a window sash having upper and lower rails and upright stiles interconnecting said upper and lower rails, means for supporting said sash within said frame for movement between a closed and locked position and an open and an unlocked position, said supporting means including means for pivotally mounting said sash within said frame for movement about a substantially horizontal axis for making the normal exterior side of said window accessible from the interior side when said sash is in said open and unlocked position, said pivotal mounting means including a rigid member projecting laterally from each of said stiles towards each of said jambs, means on each of said jambs for securely receiving said rigid members, said receiving means including a guidably mounted member vertically movable longitudinally of said jambs so that said sash is vertically movable relative to said frame, means interconnecting said receiving means and said frame for normally biasing said sash to said upper position, said supporting means further including means for vertically

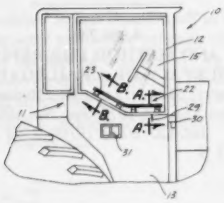
moving said sash between an upper position and a lower position when said stiles and said jambs are substantially co-extensive with each other, and cooperating means mounted on said sash, on said frame and on said vertical moving means for preventing sidewise, front and back, and upward and downward movement of said sash within said frame when said sash is in said closed and locked position.

4,086,728

HANDLE FOR A TRACTOR CAB DOOR

Dwayne L. Fosseen, R.R. #2, Radcliffe, Iowa 50230

Filed Feb. 22, 1977, Ser. No. 770,399
Int. Cl.[2] E05B *1/00*
U.S. Cl. 49—460 **1 Claim**



1. A handle in combination with a door for a tractor cab, said door comprising:
- a frame having a lower and an upper portion;
- a sheet member attached to the lower portion of said frame for preventing wind and moisture from passing through said door, said sheet member including an upper section;
- a transparent window member attached to the upper portion of said frame for shielding out wind and moisture, said window section including a lower section; and
- means for sealing the upper section of the sheet member to the lower section of the window member, said sealing means including a front section and a rear section, said front section including a substantially horizontally disposed surface, said rear section of said sealing means including a substantially planar surface disposed at an angle with respect to the horizontal surface of the front section, one end of the surface of the front section being connected to one end of the surface of the rear section;

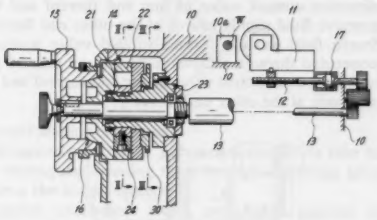
said handle comprising:
- a bar disposed substantially parallel to said sealing means, said bar being circular in cross sectional shape, a first portion of said bar being parallel to said horizontally disposed surface and a second portion of said bar being parallel to the planar surface of the rear section, said bar being disposed upwardly from and spaced from said sealing means; and
- means for attaching said bar to said door, said attaching means comprising a first member rigidly attached to said bar at one end thereof, the other end of said first member including a flat surface, said flat surface being disposed in juxtaposition to said horizontally disposed surface, a hole being disposed in said other end of the first member and a threaded member extending through said hole and through said horizontally disposed surface; and, a second member rigidly attached to said bar at one end thereof, the other end of said second member including a flat surface which is disposed in juxtaposition to said planar surface of the rear section, a hole being disposed in the other end of the second member and a threaded member extending through the hole in the second member and through said planar surface of the rear section of the sealing means.

4,086,729

FEED AMOUNT SETTING DEVICE FOR A MACHINE TOOL

Makoto Kikuchi, Kariya, and Ikuo Otsu, Toyota, both of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Japan

Filed May 10, 1977, Ser. No. 795,520
Claims priority, application Japan, May 27, 1976, 51-67803[U]
Int. Cl.[2] B24B *49/00*
U.S. Cl. 51—165.8 **7 Claims**



1. A feed amount setting device for a machine tool wherein a feed device is provided to relatively feed tool and workpiece carriers, comprising:
- a cam member supported to be movable with said feed device;
- a follower rod slidably guided for axial movement and urged to contact said cam member, said follower rod being formed with an operating face;
- a lever support slidably guided for movement in a direction parallel with the axis of said follower rod;
- adjusting means for adjustably postioning said lever support in the sliding direction thereof;
- switch actuation means supported for movement in a direction substantially perpendicular to the axis of said follower rod;
- a lever arm pivotably carried on said lever support for transmitting movement of said follower rod to said switch actuation means in a predetermined magnification ratio when engaged with said operating face;
- contact face means extending in the sliding direction of said lever support for maintaining contacting engagement between said lever arm and said switch actuating means within an adjustable range of said lever support; and
- a switch element stationarily disposed for controlling said feed device when actuated by said switch actuation means.

4,086,730

FEED APPARATUS FOR TABLE OF MACHINE TOOL

Akiyoshi Kobayashi, Kariya, and Kenshi Fukada, Nukata, both of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Japan

Filed May 10, 1977, Ser. No. 795,447
Claims priority, application Japan, Jun. 10, 1976, 51-68155
Int. Cl.[2] B24B *500*
U.S. Cl. 51—165.9 **6 Claims**

1. A feed apparatus for a table slidably mounted on a bed of a machine tool comprising:
- manual feed means operatively connectable with said table for rendering a manual feed thereto;
- hydraulically actuated means operatively connected to said table for rendering an automatic feed thereto;
- a valve housing mounted within said bed and provided with a valve bore;
- a spool valve member rotatably and slidably received in said valve bore;
- means for manually positioning said spool valve member at manual and automatic positions;
- a first fluid passage formed in said valve housing and connected at one end thereof to said valve bore and at the

other end thereof to one of the end chambers of said hydraulically actuated means;

a second fluid passage formed in said valve housing and connected at one end thereof to said valve bore and at the other end thereof to the other end chamber of said hydraulically actuated means;

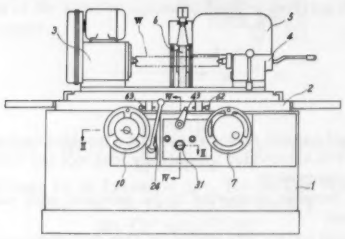
a direction control valve formed in said valve housing;

a pressure fluid supply source;

a reservoir;

a third fluid passage formed in said valve housing and connected through said valve bore to an inlet port of said direction control valve at one end thereof and to said pressure fluid supply source at the other end thereof;

a fourth fluid passage formed in said valve housing and connected through said valve bore to an exhaust port of said direction control valve at one end thereof and to said reservoir at the other end thereof;



said spool valve member being operable, when positioned at the manual position, to communicate said first and second fluid passages with each other and to block said third and fourth fluid passages, and being operable, when positioned at the automatic position, to cut off the communication between said first and second fluid passages and to uncover one of said third and fourth fluid passages:

said direction control valve being operable to selectively communicate the inlet and exhaust ports thereof with said first and second fluid passages;

throttle means formed on said spool valve member for variably restricting the other of said third and fourth fluid passages dependent upon the angular position of said spool valve member when said spool valve member is at the automatic position; and

a knob rotatably mounted on said bed, and engaged with said spool valve member but restrained from rotation relative thereto.

4,086,731

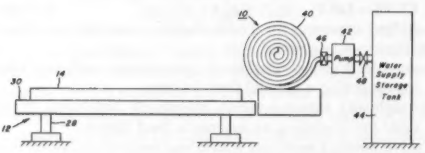
PLATE HOLD-DOWN DEVICE FOR ABRASIVE CUTTING OF METAL PLATES

David L. Burk, Pittsburgh, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Jan. 10, 1977, Ser. No. 758,256

Int. Cl.[2] B24B *41/06*

U.S. Cl. 51—216 R **9 Claims**



1. A plate hold down device for use with an apparatus for cutting metal plates having a support therefor and guide means for moving an abrasive cutting wheel along a line of cut for a metal plate positioned onto the support comprising:

a flexible expansible and contractable hold-down device closed at one end and open at the other end and adapted to be filled with a liquid and moved onto the surface of the metal plate for holding the plate on said table, means mounting said hold-down device adjacent said support, said hold-down device being movable from a contracted condition out of surface contact with the metal plate to an expanded condition into surface contact with the metal plate, and

liquid supply and withdrawal means in flow communication with the open end of said hold-down device for supplying liquid thereto to increase the weight thereof and moving said hold-down device into said expanded condition in surface contact with the metal plate adjacent said line of cut and hold the plate to said support to damp and absorb plate vibrations and for exhausting the liquid from said hold-down device to decrease the weight thereof and for removal thereof from the metal plate and adjacent to said support.

4,086,732

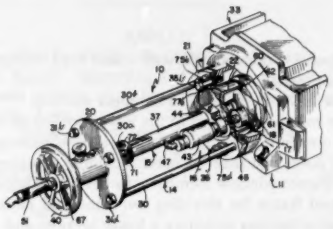
APPARATUS AND METHOD FOR REFINISHING THE END SURFACE OF A RAILROAD AXLE

William K. Ramsey, 5134 N. Lake Dr., Roanoke, Va. 24019

Filed Aug. 27, 1975, Ser. No. 608,104

Int. Cl.[2] B24B *19/00, 1/00*

U.S. Cl. 51—241 S **26 Claims**



1. A grinding apparatus for the on site refinishing of a scored end surface of an axle in a bearing-axle assembly of the type wherein lateral shifting of the axle with respect to the bearing is restrained by the use of a thrust block contained in a journal box having a housing which includes an access opening which surrounds said axle end surface to be refinished, said axle end surface being generally perpendicular to the axis of said axle, said apparatus comprising: a frame; means for detachably connecting said frame to said journal box housing adjacent said access opening; support means mounted to said frame; and, a grinding tool mounted to said support means, said grinding tool including a working face which is generally perpendicular to the axis of said axle and which is engageable with said axle end surface for abrasively refinishing the same, said frame also including a skirt portion within which the working face of said grinding tool is located.

4,086,733

METHOD OF MAKING A REAMER, AND A REAMER MADE IN ACCORDANCE WITH THIS METHOD

Istvan Vig, Olten, Switzerland, assignor to Merz AG Dulliken, Dulliken, Switzerland

Filed Jun. 9, 1976, Ser. No. 694,482

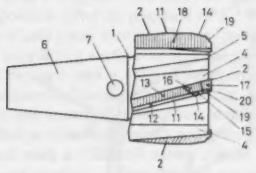
Claims priority, application Switzerland, Jun. 12, 1975, 7590/75

Int. Cl.[2] B24B *1/00*

U.S. Cl. 51—288 **15 Claims**

1. A method of making a reamer with helically extending carbide cutting edges and having a given diameter characterized in that a reamer body having roughly shaped helical teeth thereon is provided along the front face of each tooth with a groove extending rectilinearly lengthwise and obliquely to the

reamer axis, a small straight carbide strip shaped to fit snugly within the groove is fixed in each groove, the height of the strip being such that its upper end projects radially, over its whole length, above the tooth end and also beyond said given diameter of the reamer, said carbide strip extending obliquely of the reamer axis, and each such strip is subjected to a grinding operation in which its upper end projecting beyond said



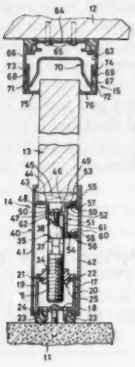
given reamer diameter is first rounded off to conform to said given reamer diameter and a first helically extending cutting edge is formed at the leading edge thereof by grinding a helically extending face on the front surface thereof, and then the end portion of the strip is separately ground to produce a main cutting edge inclined at an angle to said first cutting edge in the direction of said reamer axis.

4,086,734

ADJUSTABLE-HEIGHT BASEBOARD FOR PARTITIONS

Muriyoshi Hayashi, Kurobe, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Aug. 8, 1977, Ser. No. 822,546
Claims priority, application Japan, Aug. 11, 1976, 51-107988
Int. Cl.[2] E04B *2/74*
U.S. Cl. 52—122 **7 Claims**



1. An adjustable-height baseboard for mounting a partition including a panel on a foundation, comprising:

(a) a rail member adapted for being mounted on the foundation, said rail member having a pair of spaced lips extending therealong and projecting toward each other;

(b) a jointing adapter having a tapped hole therein and a pair of opposite grooves receiving said lips therein, said jointing adapter being movable along said rail member;

(c) an elongate connector having at its one end an externally threaded portion which threadedly extends into said tapped hole; and

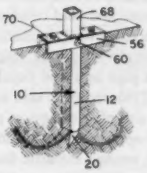
(d) a baseboard covering having means for supporting a lower edge of the panel, said baseboard covering being connected to said connector.

4,086,735

SOIL ANCHOR

Ray Adams, 1450 S. Manhattan Ave., Fullerton, Calif. 92631

Filed May 31, 1977, Ser. No. 801,913
Int. Cl.[2] E02D *5/80*
U.S. Cl. 52—160 **5 Claims**



1. A soil anchor comprising:

an elongated rectangular galvanized steel drive tube having a rectangular opening therethrough extending generally along the length thereof;

elongated attachment means detachably secured to the upper end of said drive tube for the attachment of a canopy support to said drive tube;

a point secured on the bottom end of said drive tube, said point being comprised of a block of ferrous material having crimping grooves therein, said drive tube being crimped into said crimping grooves on said point so that said point is secured to said drive tube, said point having shoulders thereon, the forward end of said drive tube resting against said shoulders so that driving force down the drive tube is transmitted to said point on said shoulders, said point having a forwardly directed pointed end to serve as the pointed end for said tube as said soil anchor is driven into the soil;

said point having two guide surfaces opposite each other thereon and an opening slot between each of said guide surfaces and the forward end of said drive tube, said point extending into said drive tube so that a portion of each of said guide surfaces is within said guide tube, said point adjacent said guide surface being tapered to frictionally engage within the forward end of said drive tube; and

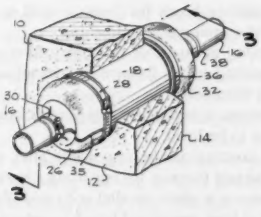
two anchor straps for positioning in said opening through said tubular drive, each of said anchor straps being for positioning against one of said guide surfaces and out of one of said lateral openings in said drive tube for anchoring in soil.

4,086,736

FIRE AND LIQUID SEALS FOR PIPES AND CONDUITS AND METHOD OF FORMING SAME

Larry P. Landrigan, La Cygne, Kans., assignor to Daniel International Corporation, Greenville, S.C.

Filed Dec. 16, 1976, Ser. No. 751,326
Int. Cl.[2] E04C *2/52*; F16L *5/00*; E04B *5/48*
U.S. Cl. 52—221 **18 Claims**



1. A fire seal for a structural wall penetration comprising a support pipe of circular cross-section embedded in and extending through a structural wall, a conduit of circular cross-sec-

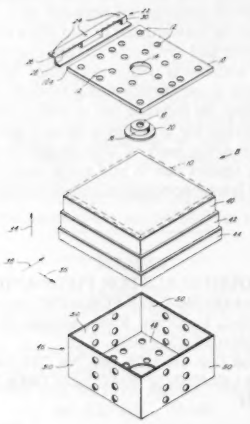
tion of smaller size than said support pipe oriented in and extending through said support pipe with the outer wall of said conduit being spaced from the inner wall of said support pipe, a packing of heat resistant thermal insulation material comprising a body of silicone foam occupying the space between the outer wall of said conduit and the inner wall surface of said support pipe, a first flexible boot means extending between one end of said support pipe and said conduit on one side of and externally of said structural wall, inelastic fastening means for clampingly and sealingly fastening said first flexible boot means to said support pipe and said conduit, a second flexible boot means positioned externally of said structural wall extending between a second end of said support pipe and a second end of said conduit on the opposite side of said structural wall from said first flexible boot, second inelastic fastening means clampingly and sealingly fastening said second flexible boot means to said second end of said support pipe and said second end of said conduit.

4,086,737

REFRACTORY FIBER BLANKET MODULE WITH HEAT SHRINKAGE COMPENSATION

Carlisle O. Byrd, Jr., Houston, Tex., assignor to Johns-Manville Corporation, Denver, Colo.

Filed Jan. 7, 1977, Ser. No. 757,772
Int. Cl.[2] E04C *3/10*; E04B *1/80*
U.S. Cl. 52—227 **21 Claims**



1. An insulating block for lining a wall or roof area of a furnace or like equipment, comprising:

(a) a plurality of layers of refractory fiber blanket adapted for mounting to the furnace wall in substantially parallel relation therewith;

(b) at least one of said layers being larger in areal extent than the area to be lined;

(c) force-exerting means, removable after said block is installed in said furnace, for imparting a horizontal compressive force in a plane parallel with said plurality of layers on said at least one of said layers to reduce the areal extent of same to substantially the area to be lined; and

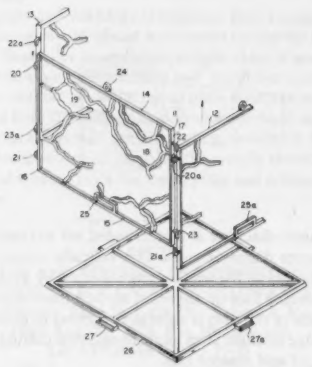
(d) means for attaching said plurality of layers to the area to be lined.

4,086,738

KIT AND COMPONENTS FOR CONSTRUCTING DECORATIVE POLYHEDRALS

Louis Saccoccio, 25 St. Mary's Dr., Cranston, R.I. 02920

Filed Oct. 12, 1976, Ser. No. 731,788
Int. Cl.[2] F04C *1/42*
U.S. Cl. 52—270 **7 Claims**



1. A decorative article of polyhedral shape comprising a base and a plurality of adjacently disposed sidewalls upstanding therefrom and positioned with respect to each other so as to form a generally closed perimeter, said sidewalls having a continuous coplanar edge strip defining elements of a polygonal configuration, and at least one coplanar interior strip portion attached to said edge strip and defining decorative interstices within said edge strip for receipt of settable plastic material, said edge strip having at least first and second generally opposed edge strip portions thereof generally equal length such that the first edge strip portion or each sidewall is positioned adjacent a second edge strip portion of an adjacent sidewall, first engagement means disposed on said first edge strip portions and second engagement means disposed on said second edge strip portions, said first and second engagement means comprising downwardly and upwardly opening hooks respectively, said first and second hooks adapted to interengage each other and third and fourth engagement means provided on those strip portions proximal said base and said base respectively, said third and fourth means adapted to interengage each other.

4,086,739

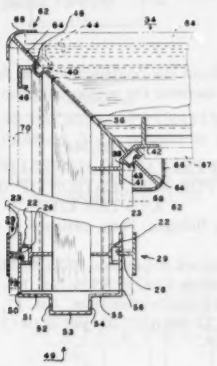
WALL CONSTRUCTION HAVING PANEL ATTACHMENT MEANS

Raymond L. Hall, 8 Knollwood Trail, E., Brookside, N.J. 07926

Filed Apr. 10, 1975, Ser. No. 566,917
Int. Cl.[2] E04B *2/82*
U.S. Cl. 52—281 **7 Claims**

1. A wall construction including a plurality of panel members of like selected thickness and a panel attachment means provided by a combination of components, said attachment means including a plurality of studs, each stud having a selected length and being formed with at least one outer panel member supporting face, at least one slot portion longitudinally disposed and formed in said supporting face of each of said studs, an undercut formed in each of said studs and being aligned with said slot, the undercut being formed to open to the slot and providing at least one shoulder surface parallel with the supporting face and being disposed a predetermined short distance from the supporting face, said studs being arranged in a selected order, said panel members being secured to said studs by a plurality of J-clips which are rotatably and removably mounted to the studs, each J-clip including a main stem portion having a first and second bar element extending a short

distance in an angular manner from a first end of the main stem portion and forming panel member engaging portions and the opposed end of the main stem having a bent stem end portion extending to one side out of the plane of the main stem and deviating at least thirty degrees from the plane of the main stem, a first one of the panel members being located in position against the supporting surface of one of the studs so that said slot of said stud is exposed, and said first panel member being located in position prior to insertion of a J-clip in said slot, a second one of said panel members being located in position and against the supporting surface of said one of said studs so that said slot is exposed and a second panel member being positioned subsequent to insertion of said J-clip, said bent stem end portion and said lower portion of the main stem adjacent the bent stem end portion being sized and inserted in and through said slot and with a rotatable manipulation of the J-clip the bent stem end portion is brought into engagement with the



engaging shoulder of the slot with the panel member engaging portion of the clip brought into a position substantially parallel to the panel supporting face of said stud, the bent stem end portion extending laterally of the main stem a distance greater than the width of said slot, the main stem of said J-clip member having a length so that the panel member engaging portion of the J-clip is sized and is precisely spaced from the panel supporting face of the said one of the studs a distance substantially equal to the first panel member thickness and said first panel member being positioned in a channel formed between the panel supporting face of the said one of the studs, the main stem portion and said first bar element, and said second panel member being secured to the said one of the studs and being positioned in a channel formed between the panel supporting face of the said one of the studs, the main stem portion and the second bar element, said second panel member being positioned subsequent to said insertion of the J-clip member in the slot of the said one of the studs.

4,086,740

BLOCKS OF REFRACTORY CONCRETE

Keith Annett, Birmingham, England, assignor to Foseco Trading A.G., Switzerland

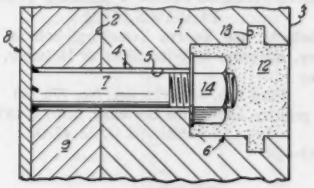
Filed Oct. 12, 1976, Ser. No. 731,143

Claims priority, application United Kingdom, Oct. 10, 1975, 41688/75

Int. Cl.[2] E04B *1/38*

U.S. Cl. 52—511 **1 Claim**

1. In combination a block of refractory concrete having at least one through hole and a bolt having a nut thereon and by which the block is secured to a support, said hole having a relatively narrow diameter portion opening at one face and through which said bolt extends and a relatively major diameter portion opening at the opposite face and in which said nut is located, with the interface of said narrow and major diameter portions forming a back wall upon which said nut is disposed, said major diameter portion having a keying configuration in the form a continuous ring-like groove in the wall



thereof, said major diameter portion being filled with a refractory concrete paste.

4,086,741

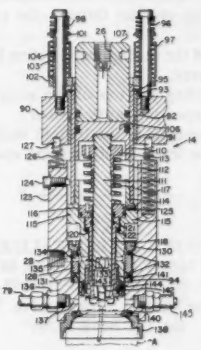
IMPACT UNDERCAP FILLER

Robert L. Williams, Davenport, Iowa, assignor to The Kartridg Pak Co., Davenport, Iowa

Filed Dec. 20, 1976, Ser. No. 752,414

Int. Cl.[2] B65B *31/00*

U.S. Cl. 53—12 **7 Claims**

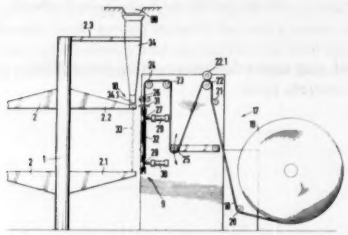


3. In the undercap method of charging compressed gas propellant by means of an undercap filler into an aerosol container containing a predetermined quantity of product while the cap of the valve cap dip tube assembly therefor is temporarily lifted from resting position on the bead of the container top opening, the improvement which comprises, delivering a metered charge of compressed gas propellant into said container through a restricted annular orifice of predetermined size created by allowing said cap to lift a predetermined distance against a charging hold-down force provided by a set of relatively weak springs, and immediately after charging crimping said cap to said bead while said cap is held down in sealing engagement with said bead by a crimping hold-down force substantially greater than said charging hold-down force and provided by a set of relatively strong springs.

4,086,742
METHOD AND APPARATUS FOR FULLY AUTOMATICALLY FILLING SACKS OR BAGS MADE DURING FILLING FROM A WEB OF TUBULAR PLASTICS FILM

Fritz Achelpohl, and Konrad Tetenborg, both of Lengerich, Germany, assignors to Windmöller & Hölscher, Lengerich, Germany

Filed Feb. 24, 1977, Ser. No. 771,745
Claims priority, application Germany, Mar. 1, 1976, 2608456
Int. Cl.[2] B65B *1/02, 3/02, 43/00*
U.S. Cl. 53—29 **14 Claims**



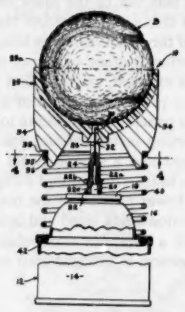
1. A method of fully automatically filling sacks or bags made during filling from a web of tubular plastics film comprising:
- severing a tube section having folds, from a web of tubular plastics film;
- clamping a bottom section of the severed tube section along its width at its bottom;
- clamping top portions of the severed tube section at its top only in the region of the folds and transversely to the longitudinal axis of the severed tube section;
- pulling the side walls of the severed tube section apart between the clamped top portions;
- transversely welding the bottom of the severed tube section along its entire width below the clamped bottom section;
- introducing filling material through the pulled apart side walls;
- closing the top of the severed tube section by stretching the side walls thereof;
- transversely welding the top of the severed tube section above the clamped top portions; and
- releasing the clamping of the bottom section and the top portions of the severed tube section and depositing the filled sack.

4,086,743
TENNIS BALL REVITALIZER

Dallett Hoopes, 99 Mill, Waterbury, Conn. 06720

Continuation of Ser. No. 565,831, Apr. 7, 1975, abandoned. This application Nov. 10, 1976, Ser. No. 740,482
Int. Cl.[2] B65B *31/08*
U.S. Cl. 53—79 **10 Claims**

1. Apparatus for revitalizing a tennis ball comprising:
- a. a container of fluid under pressure and having an upstanding tubular discharge stem means with a valve at its lower end operable by depressing the stem means;
- b. a tubular needle operatively connected to the stem means and extending upward above the upper end thereof;
- c. a tennis-ball-receiving cup above the container having an opening at the center of the bottom thereof the opening being vertically aligned with the needle;
- d. resilient means disposed about the needle and resting on the container and engaging and supporting the cup normally at a level above the top of the needle and permitting some downward movement of the cup independent of the needle so that the needle may be received through the opening and penetrate the ball; and
- e. an engaging surface associated with the cup adapted as the cup and ball are moved down to depress the stem means, opening said valve when the cup is down and the needle extends up into the ball

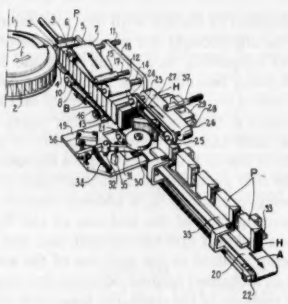


whereby fluid from the container moves through the needle into the ball to increase the pressure therein.

4,086,744
DEVICE FOR PREPARING HINGE-LID PACKETS OF CIGARETTES FOR APPLICATION OF SEALING STRIPS AND THE LIKE

Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy

Continuation-in-part of Ser. No. 560,138, Mar. 20, 1975. This application Oct. 15, 1976, Ser. No. 732,599
Claims priority, application Italy, Apr. 17, 1974, 3362 A/74
Int. Cl.[2] B65B *61/00;* **198** *411;412;415;416*
U.S. Cl. 53—137 **2 Claims**



1. A device for preparing hinge-lid cigarette packets for sealing, comprising a first conveyor belt for packets filled with cigarettes, each packet having a pair of wide sides, a pair of long narrow sides, and a pair of short narrow end portions, one of which comprises a hinge-lid, the conveyor belt being disposed to receive each packet, positioned transversely of the conveyor belt in an initial side-by-side contact relationship wherein the received packet rests on one of its long narrow sides with the wide side of the packet contacting wide sides of preceding and following packets and the conveyor belt being driven to advance at a corresponding speed, a second conveyor belt driven to advance at a higher speed than the first conveyor belt for modifying the initial relationship of the packets for spacing the packets from one another on said second conveyor belt, and to advance the so-spaced packets to a station for applying strip-like material to the hinge-lids, and turning means disposed in an upstream portion of said second conveyor belt, said turning means comprising;
- a narrow driving belt positioned parallel to and spaced above a portion of the second conveyor belt and normally

contacting portions of the long narrow sides of the packets adjacent the ends thereof comprising the hinge-lids;

a deflector unit positioned above a portion of the second conveyor belt which portion normally underlies portions of the long sides of the packets remote from the hinge-lids, for deflecting the spaced packets from their being positioned transversely of the second conveyor belt; and

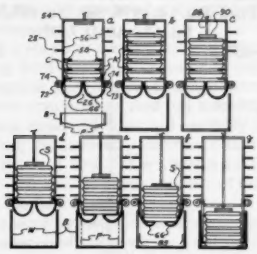
means for moving the narrow driving belt in the same direction and at the same speed as the second conveyor belt, so that a portion of an upper long narrow side of each packet, adjacent the hinge-lid, is engaged by the narrow driving belt, upstream of the deflector unit to provide a narrow belt-contact area on and travelling with the packet and narrow driving belt past the deflector unit, and thereby to provide in said area a pivot, similarly travelling for turning the packet about the pivot upon said deflecting, into a position longitudinal of the second conveyor belt and with the hinge-lid facing forward.

4,086,745

CASE PACKING APPARATUS

Otis M. Caudle, Richfield, N.C., assignor to Eggineers, Inc., Richfield, N.C.

Filed Jan. 26, 1977, Ser. No. 762,644
Int. Cl.² B65B *5/06, 35/50*
U.S. Cl. 53—159 **14 Claims**



1. Case packing apparatus comprising means for releasably supporting a plurality of objects in vertically spaced layers above an object receiving case, means for manipulating said supporting means to lower the spaced layer of objects sequentially from the top down to form a solid stack above the case, and means for lowering the stack into the case and releasing the stack thereinto, said stack lowering means being retractable from the case after stack release.

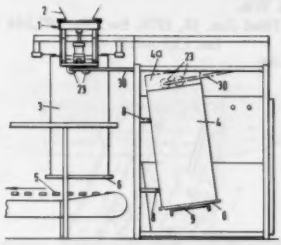
4,086,746

PACKAGING MACHINES

Robert Fell Christy, Maldon, England, assignor to Robert Christy Engineering Limited, Ipswich, England

Filed Jun. 9, 1977, Ser. No. 804,917
Claims priority, application United Kingdom, Jun. 10, 1976, 24097/76
Int. Cl.² B65B *43/36*
U.S. Cl. 53—188 **6 Claims**

1. In a machine for presenting bags successively to a filling spout or the like: means for supporting a stack of bags with each bag in a generally vertical plane, means for separating the lower portion of the end bag of the stack from the remaining bags of the stack, means for lifting the separated lower portion of such bag to lift the bag until an upper marginal portion is clear of the stack, suction means for engaging opposed sides of the upper marginal portion of the bag, means for separating the said suction means to open the bag, and means for transporting



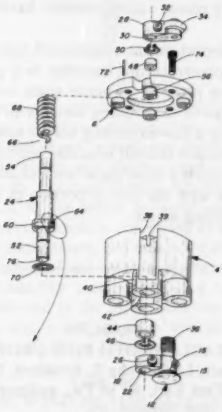
the said suction means to carry the bag from the stack to the filling spout or the like.

4,086,747

HEADSET DEVICE FOR A CAPPING MACHINE

Philip S. Gorton, Richland, Wash., and Ronald K. Coleman, Columbus, Ohio, assignors to Aluminum Company of America, Alcoa Center, Pa.

Filed May 5, 1977, Ser. No. 793,360
Int. Cl.² B67B *3/18;* **B65B** *7/28*
U.S. Cl. 53—340 **11 Claims**



1. A headset device of the type for use with a capping machine for securing closures on containers comprising:

a housing adapted to be supported on a spindle of a capping machine;

a pivot shaft disposed for rotational movement in said housing;

roller means and a cam follower means pivotally mounted on said pivot shaft;

cam means adapted to be mounted for axial movement on said spindle for pivotally actuating said cam follower means and said roller means radially outward; and

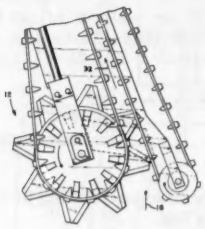
resilient torsion means disposed for operable coaction between said housing and said roller means for generating a predetermined radial inward force on said roller means for deformably securing a closure on a container.

4,086,748

ROTARY CUTTING SYSTEM

Wilmer E. Witt, Appleton, Wis., assignor to Koehring Company, Brookfield, Wis.

Filed Jun. 18, 1976, Ser. No. 697,544
Int. Cl.[2] A01D *45/02*
U.S. Cl. 56—98 **24 Claims**



1. In a crop handling apparatus, the improvement comprising a rotary sickle assembly including:

a rotatable blade support member;

means for mounting said blade support member for rotation about an axis;

means for rotationally driving said blade support member about said axis;

a blade mounted on said blade support member for rotation therewith, said blade having a central portion with a plurality of cutting edges projecting outwardly therefrom and arranged to travel in a cutting plane perpendicular to said axis, said central portion being affixed to said support member and extending inwardly thereon to a point near said axis;

a substantially planar cutting member having a cutting edge; and

stationary support means constructed and arranged to support said planar cutting member in a plane intersecting said cutting plane at an acute angle and to position the cutting edge of said cutting member in contact with said blade along a line extending across substantially the full radial dimension thereof whereby said cutting edges cooperate to provide a shearing action and said cutting member cooperates with the central portion of said blade to provide a cleaning action.

4,086,749

ADJUSTABLE WIDTH ROW CROP HEADER

James G. Greiner, Leola; John E. Brelsford, Terre Hill, and Joe E. Shriver, East Earl, all of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

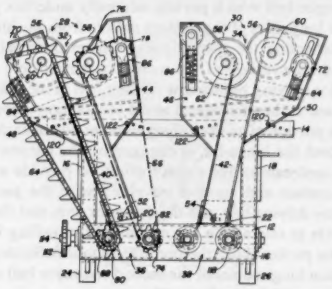
Filed Aug. 16, 1976, Ser. No. 714,534
Int. Cl.[2] A01D *45/02*
U.S. Cl. 56—98 **7 Claims**

1. A multi-row crop header for a harvesting machine comprising:

(a) a frame;

(b) a plurality of fore-and-aft row crop units adaptable to receive respective rows of crop as the machine advances forwardly over a field of crop planted in spaced apart rows, each row crop unit having an elongated passageway with a front inlet opening for receiving a row of crop and a rear discharge opening;

(c) means for pivotally mounting each row crop unit individually on said frame for laterally movement relative to the forward direction of travel whereby the lateral spacing between said front inlet openings of said respective row crop units may be varied to receive rows of crop planted in a plurality of different row widths; and



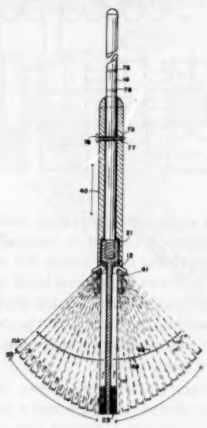
(d) means for fastening said respective row crop units in a plurality of laterally spaced positions corresponding to said plurality of different row widths.

4,086,750

ADJUSTABLE RAKE

Althea T. White, Fillmore, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Jun. 14, 1976, Ser. No. 695,700
Int. Cl.[2] A01D *7/00*
U.S. Cl. 56—400.18 **3 Claims**



1. A rake fitted with prongs pivotally mounted to a pole so that the prongs may be pivoted to form a fan of varying width, with means slidably mounted on the pole to fix the prongs in a given position of fan width, comprising

a rake pole joined at one end to a socket member, with at least one pin fixed to said socket member,

a plurality of rake prongs each pivotally mounted to a said pin, with each rake prong formed with a lever section that extends from the attached rake prong at an angle offset from the axis of the said rake prong, together with

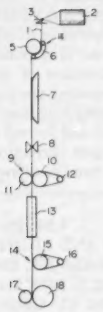
a sleeve unit slidably mounted about the rake pole and shaped so as to be slidable over said socket member so that a section of said sleeve unit may bear against each of the levers of said rake prongs when the sleeve is slid on the rake pole so as to cause the rake prongs to each pivot about the said pin.

4,086,751

PROCESS FOR PRODUCING A FUSED FALSE TWISTED CONTINUOUS FILAMENT YARN HAVING CRISPNESS CHARACTERISTICS OF HARD HIGH-TWIST YARN

Hajime Hino; Yoshiyuki Sasaki, both of Takatsuki; Toshio Sekiguthi, Ibaraki, and Masaaki Yao, Matsuyama, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Feb. 4, 1977, Ser. No. 765,481
Claims priority, application Japan, Feb. 16, 1976, 51-14811
Int. Cl.² D02G *1/02*
U.S. Cl. 57—157 TS **7 Claims**



1. A process for producing a fused false-twisted continuous filament yarn having crispness characteristic of hard twist yarns, which comprises

a. forwarding a polyester continuous filament yarn as a feed yarn having both birefringence value of 0.03 – 0.10 and break elongation of 70 – 200% to simultaneous draw-false twisting zone comprising a feed roll assembly, a heater, a false twisting mean and draw roll assembly in sequence,

b. false twisting the same at a number of turns permmeter expressed by a $\alpha \times 1000/\sqrt{De}$ wherein α is a twist coefficient of 15 – 28, and De means a denier of the yarn which has passed the false twisting means,

c. heating the same twisted yarn to a temperature of 225° – 255° C and simultaneously drawing the yarn at a draw ratio of $R_1 \times R_0$ wherein R_1 is a draw coefficient of 0.7 – 0.95, and R_0 is an apparent draw ratio to impart a drawn yarn break elongation of 30% when the feed yarn is drawn at such draw ratio (R_0),

d. maintaining the following relation exists between α and R_1

$$(-\alpha/260) + 0.99 \geqq R_1 \geqq (-\alpha/160) + 0.95$$

wherein α and R_1 is same as hereinbefore defined,

e. untwisting the heat-set and drawn yarn and consequently withdrawing the resulting yarn.

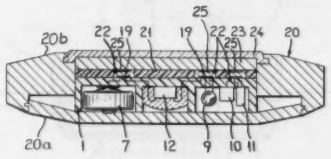
4,086,752

ELECTRONIC TIMEPIECE

Hiroo Kishimoto, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sep. 29, 1976, Ser. No. 727,988
Claims priority, application Japan, Sep. 30, 1975, 50-118505
Int. Cl.² G04B *19/34*; G04C *3/00*
U.S. Cl. 58—23 R **7 Claims**

1. An electronic timepiece comprising a case having a back and a front, a molded printed circuit board having on a back side thereof an oscillating circuit including a quartz crystal element and a condenser, an integrated time keeping circuit and connections for a power source, and having on a front side thereof a plurality of terminal electrodes connected to outputs of said time keeping circuit, said molded printed circuit board being mounted in said case with said back side thereof toward the back of the case, display means with a translucent cover mounted in the front of said case and overlying the front side of said molded printed circuit board, said display means having on a back side thereof a plurality of input electrodes, and



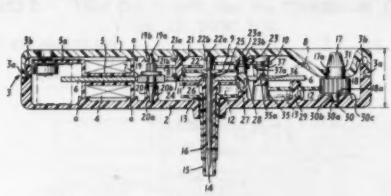
connecting means disposed between said molded printed circuit board and said display means and electrically connecting said input electrodes of said display means to said terminal electrodes of said molded printed circuit board.

4,086,753

TIMEPIECE

Hideo Tsuchiya, Matsudo, and Kiyoshi Kitai, Tokyo, both of Japan, assignors to Kabushiki Kaisha Seikosha; Seiko Koki Kabushiki Kaisha and Suwa Seikosha, all of, Japan

Filed May 24, 1976, Ser. No. 688,993
Claims priority, application Japan, May 23, 1975, 50-62183
Int. Cl.² G04C *3/00*; H02K *7/08, 7/10*
U.S. Cl. 58—23 D **6 Claims**



1. In a timepiece, the combination comprising: two base plates opposite each other and defining a space therebetween; a gear train comprised of gear wheels and disposed in the space between said base plates; and electro-mechanical converter means responsive to electrical signals for driving said gear train and disposed in the space between said base plates, wherein said converter means is comprised of a stator, a rotor positioned opposite said stator, and means for magnetizing said stator to effect rotation of said rotor, and wherein said stator is comprised of a plate-like member defining an intermediate plate portion positioned in the space between said base plate and supporting at least a gear wheel of said gear train.

4,086,754

VIEWING WINDOW FOR ELECTRONIC WRISTWATCHES EMPLOYING LIGHT EMITTING DIODE DISPLAY

Masaji Yonekawa, Sakurai, and Takehiko Sasaki, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 3, 1976, Ser. No. 663,429
Claims priority, application Japan, Mar. 4, 1975, 50-29717[U]
Int. Cl.² G04B *19/06, 19/34, 37/00*
U.S. Cl. 58—50 R **6 Claims**

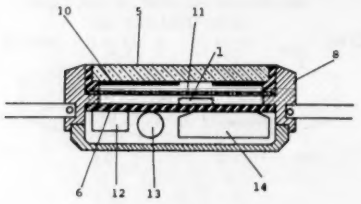
1. A viewing window for a light emitting diode (LED) display wristwatch comprising:

a casing for accommodating components of said LED display wristwatch including an LED display;

a front glass sheet received within the casing and having a viewing window region overlying said LED display;

an oranmental coating provided over the surface of the front glass sheet except over the viewing window region; and

a color filter disposed beneath the front glass sheet and over said LED display in a manner that the portion of the color filter corresponding to the viewing window region is



exposed to the outside world with the remaining portion thereof being concealed by the deposition of the ornamental coating.

4,086,755

APPARATUS FOR CORRECTING SECOND HAND OF ELECTRONIC TIMEPIECE

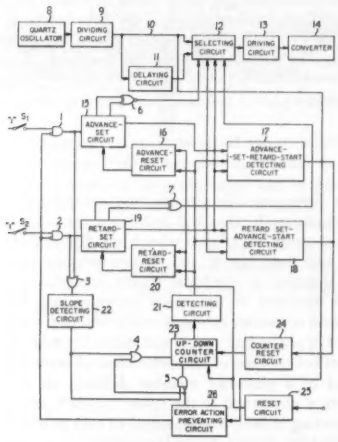
Takashi Ueda, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Nov. 13, 1975, Ser. No. 631,624

Claims priority, application Japan, Nov. 14, 1974, 49-131408[U]

Int. Cl.[2] G04B *27/08*

U.S. Cl. 58—85.5 **5 Claims**



1. In an electronic timepiece of the type having an oscillator for generating high frequency pulses; a dividing circuit connected to receive the high frequency pulses from said oscillator and divide them into lower frequency pulses suitable for use as a time standard; and indicating means responsive to the lower frequency pulses for indicating the time in at least minutes and seconds; an apparatus for correcting the seconds indication of said indicating means comprising a delaying circuit connected to receive lower frequency pulses from said dividing circuit and delay them a predetermined time period, a selecting circuit connected to receive the lower frequency pulses from said dividing circuit and connected to receive the delayed lower frequency pulses from said delaying circuit and operative in response to control signals applied thereto to selectively pass the pulses to said indicating means, resettable second advancing means operative when actuated to develop an advance control signal and apply it to said selecting circuit whereby said selecting circuit adds a lower frequency pulse to a delayed lower frequency pulse to thereby advance the seconds indication, resettable second retarding means operative when actuated to develop a retard control signal and apply it to said selecting circuit whereby said selecting circuit inhibits the passing of a lower frequency pulse to thereby retard the seconds indication, actuating means for selectively actuating said second advancing means and said second retarding means to thereby accordingly correct the seconds indication of said indicating means, said actuating means including a manually actuatable advancing switch connected to said second advancing means and operative to effect an advance of the seconds indication by one second in response to each switch actuation irrespective of the duration of the switch actuations, and a manually actuatable retarding switch connected to said second retarding means and operative to effect a retard of the seconds indication by one second in response to each switch actuation irrespective of the duration of the switch actuations, and counting means for counting the number of actuations of said advancing and retarding switches and effecting resetting of corresponding ones of said second advancing means and second retarding means upon correction of the seconds indication as determined by the number of switch actuations.

4,086,756

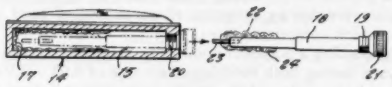
WRIST WATCH AND LIGHTER COMBINATION

Stephen Drake, 10 Standish Rd., Brentwood, N.Y. 11717

Filed Oct. 5, 1976, Ser. No. 729,653

Int. Cl.[2] G04B *37/12*

U.S. Cl. 58—152 R **3 Claims**



1. A wrist watch and lighter combination, comprising a wrist watch and a lighter, said wrist watch being attachable to a wrist band for securement around a wearer's wrist; said watch having a watch mechanism for indicating a time of day, and said lighter having means to produce a flame for lighting a cigarette or cigar; said means for producing a flame comprising a pin receptacle opening, a metal pin removably secured in said opening, a cotton wad lining said opening and a second cotton wad wrapped around an inner end of said pin, said wads being saturated with a lighter fluid, and inner end of said pin having a steel tip protruding therefrom, and an outer side of said lighter having a flint surface for scratching said steel tip thereacross, said flint surface being along a bottom of a groove recessed on said lighter outer side.

4,086,757

GAS TURBINE COOLING SYSTEM

Karl W. Karstensen, and Edward G. Meints, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 6, 1976, Ser. No. 729,746

Int. Cl.[2] F01D *25/12*

U.S. Cl. 60—39.16 R **14 Claims**

1. A gas turbine engine cooling system for a gas turbine engine having a compressor section, at least one turbine stage including a casing, a flanged shaft rotatably mounted in the casing and a turbine wheel removably fixed to the flanged shaft, the turbine cooling system comprising:

a plurality of turbine blades each having a root portion and each removably associated with the turbine wheel;

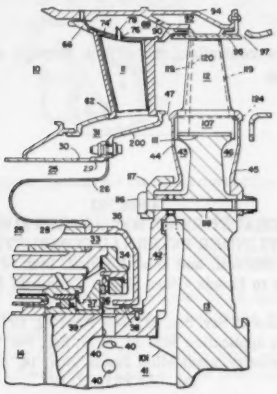
a first turbine blade retainer plate;

a second turbine blade retainer plate;

said first turbine blade retainer plate removably fixedly associated with said turbine wheel on a first side of said turbine wheel to prevent axial movement of said blades and forming a first annular cavity with said turbine wheel, said annular cavity communicating with said root portions of said turbine blades; said second turbine blade retainer

plate removably fixedly associated with said turbine wheel on the second opposite side and adjacent the flanged shaft to form a second annular cavity therewith, said second annular cavity communicating with said root portions of said turbine blades;

each of said retainer plates forming means for sealingly closing said first and second annular cavities with said retainer plates fixedly associated with said turbine wheel, said means for sealingly closing said first and second annular cavities being portions of each of said retainer plates, said portions of said retainer plates responsive to centrifugal force of rotation of said turbine wheel to urge said portions in first opposite direction towards said turbine wheel to increase said sealing force closing said first and said second annular cavities;



means for communicating cooling fluid under pressure to said second annular cavity;

the turbine wheel defining a plurality of radially extending grooves on the second side thereof and further wherein the flanged shaft defines an axial cavity adjacent the affixed turbine wheel so that said turbine wheel and said flanged shaft define a chamber communicating with said second annular cavity, and further wherein the means for communicating cooling fluid under pressure to said second annular cavity comprises a plurality of longitudinal members each adapted to fit in a corresponding radially extending groove and a compressed air means for communicating compressed air to said chamber; said longitudinal members separating said chamber into a plurality of sections whereby compressed air is directed radially outwardly towards said second annular cavity.

4,086,758

COMBINED STEAM AND GAS TURBINE PLANT AND METHOD OF OPERATION

Henrik Harboe, Kingston, England, assignor to Stal-Laval Turbin AB, Finspong, Sweden

Filed Sep. 7, 1976, Ser. No. 720,530
Claims priority, application Sweden, Sep. 12, 1975, 7510166
Int. Cl.[2] F02C *7/02, 3/26*
U.S. Cl. 60—39.02 **10 Claims**

1. A combined steam and gas turbine plant, comprising:

a gas turbine;

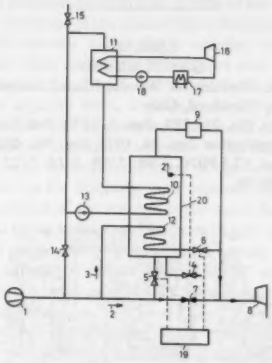
a fluidized bed combustion chamber for providing hot gas for said gas turbine;

a steam turbine;

a steam generator for providing steam for said steam turbine;

a primary heat exchanger immersed in said chamber for heating air flowing to said gas turbine;

a secondary heat exchanger also immersed in said chamber and operatively connected to said steam generator for transferring heat from said chamber to said steam genera-



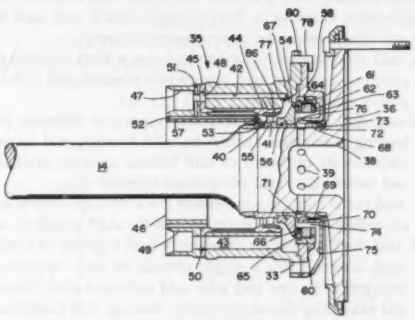
tor by means of a gaseous medium flowing from said secondary heat exchanger.

4,086,759

GAS TURBINE SHAFT AND BEARING ASSEMBLY

Karl W. Karstensen; LeRoy R. Thompson, both of Peoria, and James F. Wenninger, Morton, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 1, 1976, Ser. No. 728,587
Int. Cl.[2] F02C *7/06*
U.S. Cl. 60—39.08 **15 Claims**



1. In a gas turbine having a turbine section and a casing, the turbine section having a first end and a second end said turbine section removably fixably associatable with said casing at its first end and lubrication conduit means, a turbine shaft and bearing assembly comprising:

a shaft defining a turbine wheel mounting flange at one end, said flange adapted for mounting a turbine wheel;

a bearing assembly for rotatably fixing said shaft in said turbine section at its first end;

said bearing assembly comprising; a bearing cage removably fixable axially in said first end of said turbine section; bearing means rotatably affixing said shaft in said bearing cage; lubrication fluid passage means for providing lubrication fluid to said bearing means; lubrication fluid socket means formed with said bearing cage for sealingly receiving fluid from said lubrication conduit means to communicate fluid to said lubrication fluid passage means; first seal means for sealingly associating said shaft with said cage; second seal means for sealingly associating said shaft with said cage; said first and said second seal means disposed between said bearing means and said flange and forming

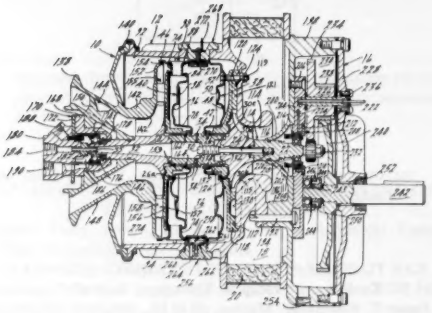
an annular cavity therebetween; and means for providing cooling fluid to said annular cavity.

4,086,760

GAS TURBINE

Richard Chute, Huntington Woods, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 214,703, Jan. 3, 1972, Pat. No. 4,034,560.
This application Jun. 24, 1974, Ser. No. 482,810
Int. Cl.[2] F02C *3/08, 7/06, 7/14, 7/22*
U.S. Cl. 60—39.36 **4 Claims**



1. In a single shaft gas turbine engine of the type comprising a housing; a shaft assembly generally within said housing and including a radial inflow turbine element discharging toward one end of the shaft assembly and a radial outflow compressor element inletting from the other end of the shaft assembly; and a combustion chamber in fluid communication with said turbine and compressor; the improvement wherein:

A. said shaft assembly further includes a shaft element disposed outboard of said compressor element and defining power takeoff means;

B. said shaft assembly is rotatably supported solely by two bearing assemblies carried by said housing and located respectively outboard of said turbine element discharge and outboard of said compressor element inlet;

C. said radial compressor element has a through central hole extending along the central axis of the shaft assembly; and

D. said shaft assembly is clampingly held together as a single rigid assembly by a single central tie bolt operatively engaged at its one end with said outboard shaft element and extending therefrom axially through said compressor element hole for engagement at its other end with another element of said shaft assembly.

4,086,761

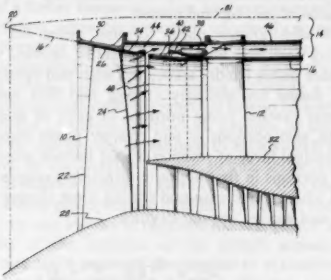
STATOR BYPASS SYSTEM FOR TURBOFAN ENGINE

Larry Allen Schaut, Seattle, and Richard Alan Zimbrick, Federal Way, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Apr. 26, 1976, Ser. No. 679,946
Int. Cl.[2] F02K *3/06*
U.S. Cl. 60—226 R **14 Claims**

1. A nacelle for a gas turbine engine of the type known as a turbofan having a fan stage including a rotor having a plurality of blades and a set of stators spaced apart and downstream of said rotor, said nacelle having an inner wall which forms an annular fan duct for the passage of air through the engine, said nacelle comprising:

means for ducting a portion of said air out of said fan duct, through said nacelle and into the atmosphere, said means having an entrance in said inner wall located upstream of said fan stators but downstream of said rotor a distance greater than one-fourth of the chord of the radially outermost rotor blade tips; and,



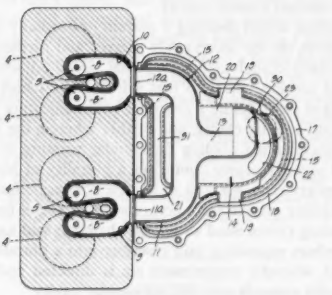
means for controlling the airflow through said means for ducting.

4,086,762

EXHAUST REACTION APPARATUS FOR MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

Yoshitoshi Sakurai, and Ikuo Kajitani, both of Niiza, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 631,046, Nov. 12, 1975, abandoned.
This application Feb. 14, 1977, Ser. No. 768,571
Claims priority, application Japan, Nov. 14, 1974, 49-130486
Int. Cl.[2] F01N *3/10*
U.S. Cl. 60—282 **5 Claims**



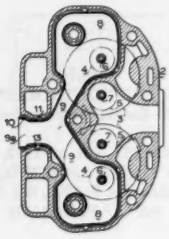
1. For use with an internal combustion engine which discharges exhaust gases from a plurality of cylinders, the improvement comprising, in combination: a generally Y-shaped exhaust pipe having a pair of exhaust pipe sections of equal length each connected to receive exhaust gases from a pair of adjacent cylinders of different exhaust timing and an outlet section connected to receive exhaust gases from both said exhaust pipe sections, a first reaction chamber connected to receive exhaust gases from said outlet section, said first reaction chamber having a continuous passage extending therethrough, said exhaust pipe sections, outlet section and continuous passage having essentially the same cross sectional area, a second reaction chamber surrounding and enclosing said first reaction chamber and surrounding and enclosing said exhaust pipe sections and said outlet section, means for discharging exhaust gases from the first reaction chamber into the second reaction chamber, and means whereby exhaust gases are discharged from said second reaction chamber.

4,086,763

THERMAL REACTOR SYSTEM FOR INTERNAL COMBUSTION ENGINE

Toshiaki Matsushita, Hino, and Yukio Shibata, Mitaka, both of Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 23, 1976, Ser. No. 716,938
Claims priority, application Japan, Apr. 13, 1976, 51-41595; Apr. 13, 1976, 51-41596; Apr. 13, 1976, 51-41597
Int. Cl.[2] F01N *3/10*
U.S. Cl. 60—282 5 Claims



1. A thermal reactor system for internal combustion engines comprising

a cylinder block formed with a cylinder defining a combustion chamber,

a piston reciprocally disposed in said cylinder defining a piston stroke volume,

a cylinder head provided on said cylinder block and having an outlet, and an exhaust port communicating with said combustion chamber of said cylinder,

a reaction chamber formed in said cylinder head positioned immediately behind said exhaust port in communication therewith,

said reaction chamber having a capacity between ¼ and 2 times the piston stroke volume of said cylinder for inducing oxidation of harmful constituents of the exhaust gases, and

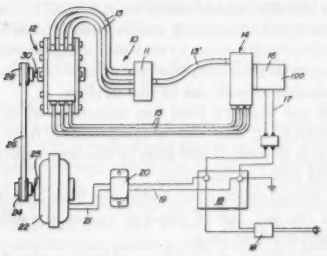
an exhaust passage communicating said reaction chamber with said outlet of said cylinder head.

4,086,764

HYDROTURBINE ENGINE DEVICE

Steven H. Brown, 3521 E. G. St., Tacoma, Wash. 98404, and David C. Walter, 725 N. 60th, Springfield, Oreg. 97477

Continuation-in-part of Ser. No. 676,543, Apr. 13, 1976, abandoned. This application Mar. 11, 1977, Ser. No. 776,906
Int. Cl.[2] F16D *31/00*
U.S. Cl. 60—325 2 Claims



1. An hydraulic turbine engine and motive power system, comprising:

a main support structure;

an output shaft mounted for rotation in said main support structure;

at least three rotor discs mounted on and splined to the output shaft, each rotor disc having notches formed in and spaced regularly about the periphery thereof;

spacer plates disposed on each side of each of the rotor discs, perimetric portions of the spacer plates forming side walls to partially enclose each of the notches on the sides thereof, the rotor discs being misaligned with each other to cause the notches in each disc to be offset relative to the notches in adjacent discs, a given notch in a given disc being forward of the adjacent notches in one adjacent disc and rearward of the adjacent notches in the other adjacent disc relative to the rotational sense of the output shaft;

fluid input means for directing high pressure liquid against opposed surfaces of the notches of the rotor discs in order to impart a force against said surfaces of said notches, the fluid input means comprising an input nozzle disposed in the main support structure and arranged adjacent the outer circumferential edges of the spaced notches of each of the rotor discs;

an exhaust output port disposed in the main support structure adjacent the outer circumferential edges of the spaced notches of each of the rotor discs and communicating therewith for receiving the liquid directed against said surfaces of the notches, one of the output ports being aligned with each one of the input nozzles, each output port communicating with one of the notches when the aligned input nozzle communicates therewith; and,

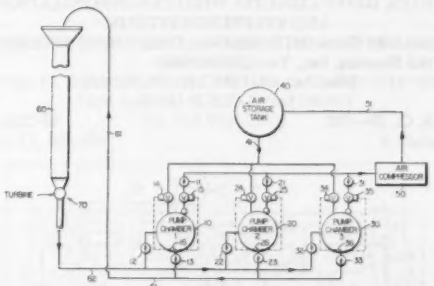
feedback means arranged between the output shaft and the fluid input means for increasing the efficiency of the system.

4,086,765

POWER GENERATING SYSTEM

James Gillilan, 4330 Howe Dr., Sherman, Tex. 75090

Filed Feb. 11, 1977, Ser. No. 767,814
Int. Cl.[2] F15B *1/00*
U.S. Cl. 60—325 8 Claims



1. A method of generating power comprising the steps of:

permitting compressed air to enter a first pump chamber filled with water so as to force said water from said chamber into a conduit and therethrough to the top of a standpipe;

permitting water in said standpipe to exit the bottom of said standpipe through a power converter adapted to generate electrical energy;

permitting the water which has passed through said power converter to enter a second pump chamber filled with air to force the air in said second pump chamber into an air conduit;

compressing the air in said air conduit; and coupling the air from an air compressor into an air storage tank.

4,086,766

FLUID COUPLING

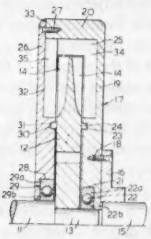
Helmut John Stieger, Langtree Lodge, Cave Road, Brough, North Humberside, England

Filed Apr. 15, 1976, Ser. No. 677,115

Claims priority, application United Kingdom, Apr. 18, 1975, 16176/75

Int. Cl.[2] F16D *33/00*

U.S. Cl. 60—330 21 Claims



1. A hydrostatic fluid coupling comprising a first member secured on a first shaft, a second member secured on a second shaft in axial alignment with said first shaft, and an annular fluid race chamber, one of said members having a vaned annulus within said fluid race chamber, the other said member presenting at least one gate in the fluid race chamber, said gate, or each gate, being arranged to allow the vaned annulus of the vaned member to pass relative thereto whilst obstructing the circumferential flow of fluid along the race chamber and said vaned annulus being arranged to present a plurality of vanes in the, or each, part of the race chamber not obstructed by the gate or gates whereby, when the race chamber is charged with fluid and the assembly is rotated, the vanes act on the fluid in the race chamber to generate a pressure gradient acting circumferentially of the axis of rotation and increasing in the chamber of rotation to create a pressure difference across the, or each, gate to impart rotation to the gated member.

4,086,767

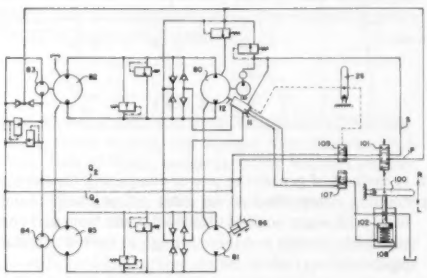
TRACK DRIVE CIRCUITS WITH SYNCHRONIZATION AND STEERING SYSTEMS

James Otto Byers, Jr., Youngstown, Ohio, assignor to Commercial Shearing, Inc., Youngstown, Ohio

Filed Jan. 24, 1977, Ser. No. 761,608

Int. Cl.[2] F15B *18/00*

U.S. Cl. 60—395 10 Claims



1. A hydraulic drive circuit for tracked vehicles with synchronization and steering systems comprising a pair of variable displacement type hydraulic pumps, master control means acting to vary the displacement of one of said pumps, manual speed and directional control means acting on said control means to position it to provide a desired speed and directions, slave control means acting on the other of said variable displacement pumps to vary its displacement, a pair of motors, each receiving fluid from one of said pumps and driven thereby, a pair of feed-back pumps, one driven by each of said motors, said pumps being connected in parallel to the slave control means whereby the pumps are normally maintained at the same speed and direction, and a manual steering control means acting on said master control means to control the direction of flow of hydraulic fluid from said pair of swash plate hydraulic pumps to said master control means and slave control means to change selectively the flow rate and direction of flow of hydraulic fluid from said pair of pumps.

4,086,768

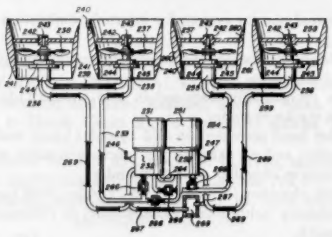
DRIVING AND CONTROLLING UNIT

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Division of Ser. No. 416,237, Nov. 15, 1973, abandoned, which is a division of Ser. No. 131,782, Apr. 6, 1971, Pat. No. 3,790,105. This application Sep. 8, 1975, Ser. No. 610,872

Int. Cl.[2] F16D *31/02*

U.S. Cl. 60—484 1 Claim



1. A drive and control unit comprising in combination:

at least a pair of power plants;

at least a pair of fluid flow producing devices;

at least a pair of hydraulic motors;

said devices associated to and driven by said power plants;

said devices including each a plurality of separated working chamber groups of each a plurality of commonly acting fluid displacement chambers and thereto associate displacement means in each of said groups;

said devices producing in said groups at least two pairs of separated output flows of hydraulic fluid under pressure with the rates of flow in said flows being constantly proportionate to each other;

at least four one-way check-valves for permitting flow therethrough in one direction and for the prevention of flow therethrough in the other direction;

separate supply lines each one extending from one of said groups of said devices to each one of said one-way valves, whereby at least each one pair of one-way valves is communicated to each one of said devices;

each one delivery fluid line associated to each of said motors; at least one communication from each one valve of each of said pairs of one-way valves to one of said delivery fluid lines;

and at least another communication from each other valve of the said pair of one-way valves to another of said delivery fluid lines;

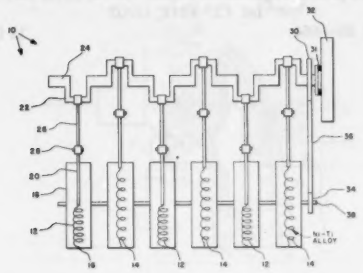
whereby flows of fluid from at least a pair of fluid flow producing devices are assured to each of said motors and whereby flow of fluid to each of said motors remains assured even when one of the power plants fails while return-flow to a failing fluid flow producing device is prevented by said one-way valves between said supply lines and said communications.

4,086,769

COMPOUND MEMORY ENGINE

Warren K. Smith, Poway, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 19, 1975, Ser. No. 578,553
Int. Cl.[2] F03G 7/06
U.S. Cl. 60—527 6 Claims



1. A mechanism for transforming heat energy into mechanical energy comprising:

a plurality of energy transfer elements having a first low temperature, low strength phase and a second higher temperature, high strength phase and formed of an alloy consisting essentially of 55% nickel and titanium remainder titanium said elements when plastically deformed within certain limits by a defined force while in said first phase being capable of being caused by application of heat to assume said second phase and return to initial form with an output of force greater than said defined force;

said elements further, when cooled over a given transformation temperature range (TTR) returning to said first phase;

said elements each having a different transformation temperature range (TTR);

means alternately heating and cooling each said element including an enclosure surrounding each said element and means for alternately and serially introducing hot and cold fluids into each said enclosure in a timed relationship to cause alternate phase changes in adjacent ones of said elements; and

means attached to each element for deforming said element while in said first phase and for receiving and utilizing the force output of said element as it changes from said second phase to said first phase.

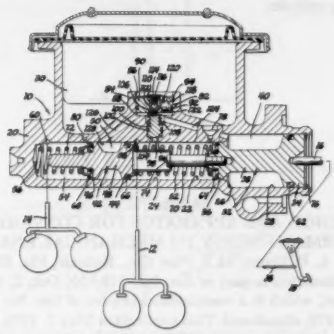
4,086,770

DUAL CIRCUIT QUICK TAKE-UP MASTER CYLINDER

Arthur R. Shaw, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 29, 1976, Ser. No. 745,850
Int. Cl.[2] B60T 11/20
U.S. Cl. 60—562 2 Claims

1. In a master cylinder having a brake fluid reservoir: a first piston defining with a wall of said master cylinder a first pressurizing chamber having a high rate of volume decrease and a low rate of pressure increase upon initial master cylinder actuation; a second and a third piston defining therebetween a second pressurizing chamber and a third pressurizing chamber defined between the third piston and an end wall of said master cylinder, said second and third pressurizing chambers having a low rate of volume decrease and a high rate of pressure increase upon master cylinder actuation and adapted to deliver pressurized brake fluid to separate brake actuating circuits; first means fluidly connecting said first pressurizing chamber to said second pressurizing chamber independently of said third pressurizing chamber when the pressure prevailing in said first pressurizing chamber is greater than the pressure prevailing in said second pressurizing chamber, second means fluid connecting said first pressurizing chamber to said third pressurizing chamber independently of said second pressurizing chamber when the pressure prevailing in said first pressurizing chamber is greater than the pressure prevailing in said third pressurizing chamber to provide high volume-low pressure fluid to said second and third pressurizing chambers from said first pressurizing chamber for quick take-ups in the brake actuating circuits, said first and second means including lip seal means defining parts of said second and third pressurizing chambers and acting to permit fluid flow therepast into each of



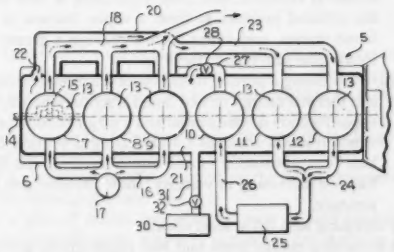
said second and third pressurizing chambers from said first pressurizing chamber but preventing fluid flow therepast in the reverse fluid flow direction; and means responsive to a predetermined pressure level in one of said second and third pressurizing chambers to vent said first pressurizing chamber to said reservoir so that further actuation of said master cylinder to generate pressure in said second and third pressurizing chambers beyond said predetermined pressure level is not resisted by pressure generated in said first pressurizing chamber after said predetermined pressure level in said one of said second and third pressurizing chambers is attained.

4,086,771

COMBINED INTERNAL COMBUSTION AND HEAT ENGINE

George M. Barrett, R.R. #5, Galt, Ontario, Canada (N1R 5S6)

Filed Aug. 30, 1976, Ser. No. 718,817
Int. Cl.[2] F02G 3/00
U.S. Cl. 60—616 8 Claims



1. A combined internal combustion and heat engine comprising engine components including cylinder block means defining a plurality of cylinders and a heat exchange jacket surrounding said cylinders, said cylinders including at least one internal combustion cylinder, at least one heated gas cylinder and at least one gas pumping cylinder, an energy supply system for delivering a combustible mixture to said internal combustion cylinder, exhaust means for receiving hot exhaust gases from said internal combustion cylinder, first conduit means for

directing heated gases from said heat exchanger jacket to said heated gas cylinder, second conduit means for directing gases from said heated gas cylinder to said pumping cylinder, and third conduit means for directing gases under pressure from said pumping cylinder back into said heat exchange jacket for reheating and recirculation, each of said cylinders including a piston, and coupling means connected to said pistons for simultaneous reciprocation of all of said pistons in constant timed phased relation, and said second conduit means including a gas cooler for making more dense expanded gases passing from said heated gas cylinder prior to passage thereof into said pumping cylinder.

4,086,772

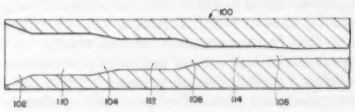
METHOD AND APPARATUS FOR CONVERTING THERMAL ENERGY TO MECHANICAL ENERGY

Kenneth A. Williams, 14 S. Pine Cir., Belleair, Fla. 33516

Continuation-in-part of Ser. No. 618,936, Oct. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 753,921, May 2, 1975, abandoned. This application May 7, 1976, Ser. No. 684,074

Int. Cl.[2] F01K *25/04, 25/10*

U.S. Cl. 60—651 **55 Claims**



1. A continuous method for converting thermal energy to mechanical energy comprising the steps of:

(a) providing a working fluid stream in a substantially saturated liquid state containing a predetermined quantity of thermal and static energy therein;

(b)

(i) converting the static energy of said fluid stream to kinetic energy by accelerating said stream whereupon a high velocity, reduced temperature and static pressure stream is obtained, said fluid vaporizing in part under the reduced pressure to form a vapor fraction in said liquid stream, said vapor fraction having a greater velocity than said liquid fraction;

(ii) transferring a portion of the vapor fraction momentum and thermal energy to said liquid fraction whereby said vapor fraction is compressed and a major portion of said vapor fraction condenses transferring a portion of its heat of condensation to said liquid fraction, said liquid fraction increasing in velocity, static pressure and temperature;

(c) repeating step (b) at least once;

(d) extracting energy from said two phase stream and converting said energy to shaft work;

(e) adding sufficient static energy to said stream to condense a major proportion by volume of the vapor fraction thereof and to permit the addition to said stream, without vaporization, of thermal energy sufficient for at least one additional cycle of said stream;

(f) passing said stream in heat absorbing relation with a source of thermal energy whereby said stream absorbs thermal energy from said source; and

(g) repeating steps (b) through (g),

4,086,773

VAPOR TEMPERATURE/PRESSURE CONTROL SYSTEM FOR AN AUTOMOTIVE VAPOR-POWERED ENGINE

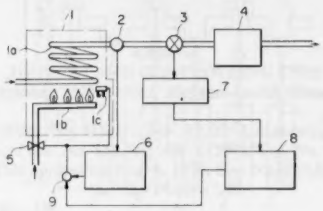
Hidetoshi Kanegae, and Akio Hosaka, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Nov. 4, 1976, Ser. No. 739,021

Claims priority, application Japan, Nov. 4, 1975, 50-150332

Int. Cl.[2] F01K *13/02*

U.S. Cl. 60—664 **12 Claims**



1. In an automotive vapor powered engine with a manually operable throttle valve, the combination comprising a vapor generating unit generating a vapor by burning fuel therein, a fuel supply valve for supplying combustion fuel to said vapor generating unit, means for sensing the temperature of the vapor generated at said vapor generating unit, means for producing a first output signal when the sensed temperature exceeds a predetermined upper value and for producing a second output signal when the sensed temperature drops below a predetermined lower value, means for closing and opening said fuel supply valve in response respectively to said first output signal and said second output signal, means for sensing the angular movement of the throttle valve and producing an acceleration command signal and a deceleration command signal, and correction control means for opening said fuel supply valve in response to the acceleration command signal independently of said second output signal and closing said fuel supply valve in response to the deceleration command signal independently of said first output signal.

4,086,774

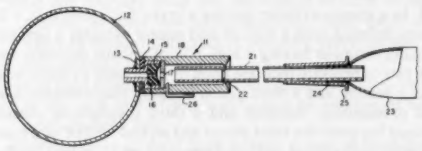
DRIP IRRIGATION SYSTEM

Ray Brown Duggins, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 15, 1977, Ser. No. 768,847

Int. Cl.[2] E02B *13/00;* **F16D** *1/00*

U.S. Cl. 61—13 **3 Claims**

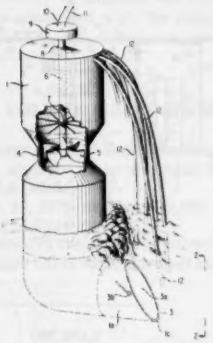


1. A drip irrigation system comprising drip irrigation tubes connected to a water supply header by means comprising a flow controller capable of maintaining the flow of water therethrough within ± 15% of a predetermined value over a water pressure range of from 3 to 70 pounds per square inch within said water supply header.

4,086,775
METHOD AND APPARATUS FOR GENERATING POWER BY SEA WAVE ACTION

Charles A. Peterson, Jr., 365 Willow Ave., Scotch Plains, N.J. 07076

Filed Apr. 6, 1977, Ser. No. 785,242
Int. Cl.[2] E02B *9/08*
U.S. Cl. 61—20 **14 Claims**



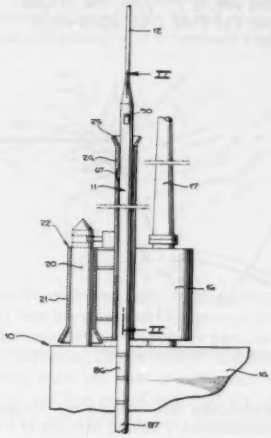
1. A system for generating power in response to wave motion in a large body of water which comprises in combination:
- a tower closed at the top and in fluid communication at the bottom with said body of water, means for forming a vacuum in said tower to thereby enclose a head of water supported by atmospheric pressure to a level substantially exceeding the mean water level of said body,
- at least one intake conduit connected to said tower having one orifice near the top of said tower, and a second orifice disposed below the mean liquid level of said large body of water,
- said tower having a Venturi constriction located on a plane partway between the base and the top of said tower,
- a turbine having its axis centered in said Venturi constriction and constructed to rotate a plurality of vanes in the principal plane thereof in response to the flow of water through said constriction, and
- a load coupled to be driven in energy transfer relationship by the rotation of said turbine.

4,086,776
LOCK MEANS FOR A TENSION LINE

Robert M. Beard, Long Beach, Calif., assignor to Compagnie Francaise Des Petroles, Paris, France

Filed Apr. 11, 1977, Ser. No. 786,220
Int. Cl.[2] E21B *15/02, 33/035*
U.S. Cl. 61—69 R **8 Claims**

1. A lock means for a tension line adapted to have a lower end releasably connected to a subsea installation, including the combination of:
- an upstanding guide and locking cylindrical member secured to said subsea installation,
- said cylindrical member having a lock dog receiving recess,
- an elongated cylindrical locking device receivable within said cylindrical member
- means securing said locking device to one end of said tension line;
- said locking device including
- a cylindrical housing having a lock dog port and a cylindrical chamber;
- an elongated piston member within said housing and having a cylindrical portion longitudinally slidable in said cylindrical chamber,
- said piston member having an elongated frusto-conical portion providing a cam surface, a lock dog slidably engagable by said cam surface and laterally movable thereby through said lock dog port into locking engagement with said lock recess;
- spring means normally biasing said piston member to hold said lock dog in locked position;

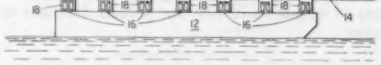


- and fluid pressure means communicating with said cylindrical chamber for moving said piston member to allow the lock dogs to move laterally inwardly into unlocked position.

4,086,777
APPARATUS FOR LAUNCHING BATTERED LEG JACKETS FOR OFFSHORE PLATFORMS

Chiang-Chun Lai, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Dec. 13, 1976, Ser. No. 750,064
Int. Cl.[2] E02B *17/00;* **B63C** *13/00*
U.S. Cl. 61—97 **5 Claims**



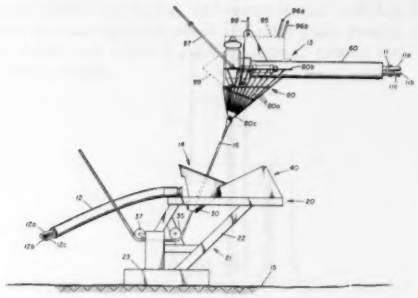
1. Apparatus for use in launching a battered leg jacket for an offshore platform from at least one barge, the platform jacket being generally supported in a horizontal position on the barge by its two lower battered legs and being launched by moving the jacket along the launching center line and off the launching end of the barge, said apparatus comprising:
- (a) At least two beams mounted on the barge transverse to the launching center line;
- (b) a pair of dollies mounted on each of said beams and movable along the length of said beam, one dolly on each side of the launching center line and each dolly providing support for one of the lower battered legs and adapted to guide the leg so that any movement of the leg relative to the dolly is along the length of the leg; and
- (c) a dolly position-coordinating means connected to each of said pairs of dollies to maintain the two dollies on each beam essentially the same distance from the launching center line, whereby during launching the dollies guide the battered legs of the jacket and the jacket is maintained on the launching center line.

4,086,778

SUBSEA CONNECTION UNIT

Raymond E. Latham, Houston, Tex., and Bernard P. Usquin, London, England, assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 6, 1977, Ser. No. 757,262
Int. Cl.[2] F16L *1/00*; E21B *43/01*
U.S. Cl. 61—110 **25 Claims**



1. A subsea connection unit for remotely connecting a first flowline to a complementary second flowline at a submerged location, said unit comprising:

a base structure adapted to be positioned at said submerged location;

means to affix said complementary second flowline to said base structure;

guide receiver means on said base structure;

a connector assembly adapted to be connected to said first flowline;

guide means on said connector assembly;

a pull-down means attached to said connector assembly and passing through said base structure for pulling said connector assembly onto said base structure;

guide assembly means on said base structure adjacent said guide receiver means for directing said guide means on said connector assembly into said guide receiver means when said connector assembly is drawn onto said base structure;

means on and carried by said connector assembly to move the end of said first flowline into proper abutment with the end of said complementary flowline when said connector assembly is in position on said base structure; and

means to connect said first and second flowlines to each other.

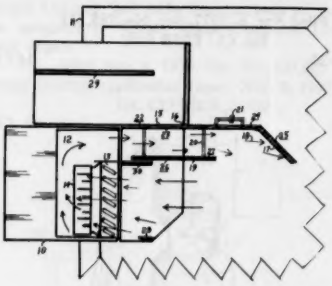
4,086,779

REFRIGERATION DEFROSTING

Roswell E. Lewis, 238 Belleville Turnpike, Kearny, N.J. 07032

Filed Jan. 25, 1977, Ser. No. 762,428
Int. Cl.[2] F25D *21/06*
U.S. Cl. 62—140 **1 Claim**

1. In a defrosting system utilizing ambient air as the defrosting medium for refrigeration system having an air cooling evaporator, blower means operating in a normal cooling cycle to take air from a cooled compartment, pass it over the evaporator and thence back to the compartment, a defrosting means which changes the air flow in the defrost made by using the blower to take ambient air from outside the compartment, direct it past the evaporator to provide the desired defrosting action and direct the air back to the ambient: the improvement in the defrosting means comprising air director which simultaneously functions as a frost build-up sensor and an arrangement for directing air in the cooling cycle mode or in the defrost mode, said air director being movably mounted in the outlet air stream from the blower means and being so arranged as to sense reduced air flow over the evaporator due to frost build-up, said air director upon sensing the need for defrost automatically moving from the cooling mode position to a defrost position thereby providing ambient air flow over the evaporator to provide defrosting and means responsive to the position



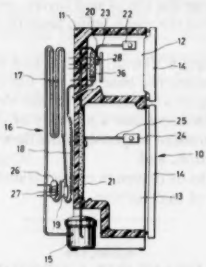
of the air director to disable the evaporator during defrosting and to restore the evaporator at the termination of the defrosting.

4,086,780

REFRIGERATING APPARATUS, IN PARTICULAR TWO-TEMPERATURE REFRIGERATOR

Wolfgang Dienemann, Giengen, Germany, assignor to Bosch-Siemens Hausgerate GmbH, Stuttgart, Germany

Filed Sep. 7, 1976, Ser. No. 720,631
Claims priority, application Germany, Sep. 9, 1975, 2539914
Int. Cl.[2] F25B *41/00*
U.S. Cl. 62—174 **7 Claims**



1. A refrigeration appliance, particularly a two-temperature refrigerator, comprising a refrigeration unit operated by a single compressor set energized by an electric current flowing through an electric circuit, a refrigeration loop with coolant flowing through a condenser, a refrigerant metering capillary device, refrigerant transfer lines, and two evaporator sections connected in series in the flow path of the refrigerant, the first of said two evaporator sections associated with a colder compartment and the second of said two evaporator sections associated with a warmer compartment, two separate, intermittently activated, control elements, one of the control elements associated with the warmer compartment and the other control element associated with the colder compartment, said control elements activated by the temperatures in the respective compartments, said control element associated with the colder compartment disposed in the electric circuit of the compressor set, said control element associated with the warmer compartment having a constant switching-on point above the freezing point, several heating elements switched on by said warmer compartment control element, one of said heating elements disposed adjacent a refrigerant collector to heat said refrigerant collector connected ahead of the metering capillary device of the refrigeration loop causing liquid refrig-

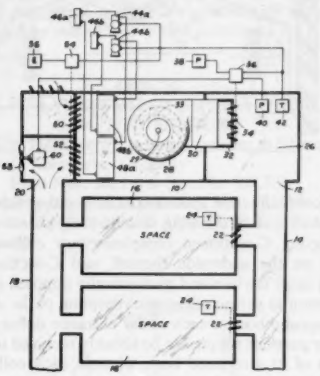
erant stored in said refrigerant collector to feed into the refrigeration loop to the first evaporator section, a second said heating element switched on by the control element of the warmer compartment is disposed adjacent to and heats a sensor of the control element in the colder compartment and thereby activates the control element of the colder compartment, and at least one additional switching element disposed in the electric circuit of the compressor set, which additional switching element operates intermittently to influence the temperature of the evaporator section associated with the colder compartment.

4,086,781

VARIABLE AIR VOLUME AIR CONDITIONING SYSTEM

Herbert M. Brody, Cherry Hill, and George L. Weigle, Cinnaminson, both of N.J., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Filed Apr. 23, 1976, Ser. No. 679,592
Int. Cl.[2] F24F *11/04, 7/06*
U.S. Cl. 62—180 **9 Claims**



1. A variable air volume air conditioning system, comprising:

means for providing air at a predetermined temperature;

a forward curved fan for delivering said air, said fan having an inlet for receiving the air from the last mentioned means and an outlet;

a pressure recovery duct having one end connected to the outlet of said fan;

outlet control vane means disposed at a second end of said pressure recovery duct for controlling the volume of air flow from said fan in response to air pressure downstream from the outlet control vane means;

duct means for directing the air from the outlet control vane means to a space to be conditioned; and

air volume control means for controlling the volume of air supplied to a space to be conditioned in accordance with the cooling requirements of said space, whereby the air pressure in the duct means is maintained substantially constant by the outlet control vane means.

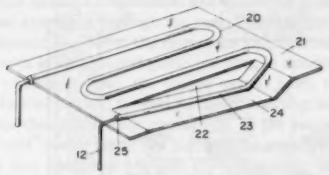
4,086,782

NOISE REDUCTION ARRANGEMENT FOR A COMPRESSOR TYPE REFRIGERATOR

Per Erik Vilhelm Forsberg, Bandhagen, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Continuation-in-part of Ser. No. 568,701, Apr. 16, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,709
Int. Cl.[2] F25D *19/00;* **F25B** *39/02, 41/06*
U.S. Cl. 62—296 **3 Claims**

1. In a refrigerating apparatus operated by a compressor and including a condenser, an evaporator having a generally horizontally disposed evaporator part and a flow restricting device for controlling the flow of refrigerant from the condenser to the evaporator in order to maintain the desired pressure difference between the condenser and evaporator, said flow restricting device being a substantially horizontally disposed capillary tube connecting said condenser to said evaporator part, the improvement comprising: said evaporator part having a conduit part that slopes downwardly with its inlet end inclined and the capillary tube has a free end that projects into said inlet end of the conduit part of said evaporator part, the slope angle of said conduit part being chosen from 1° to about 15° so that the noise resulting from the flow of refrigerant at considerable velocity from said free end of said capillary tube to the adjacent evaporator part is substantially dampened.

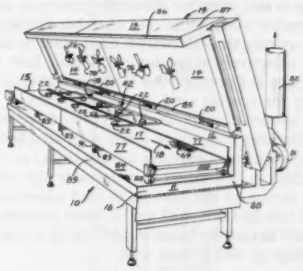


4,086,783

REFRIGERATING CHAMBER

Richard C. Wagner, Frankfort, and Horst M. Spaeth, Park Forest, both of Ill., assignors to Hollymatic Corporation, Park Forest, Ill.

Filed Dec. 15, 1976, Ser. No. 750,893
Int. Cl.[2] F25D *17/02*
U.S. Cl. 62—374 **10 Claims**



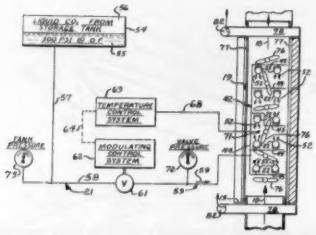
1. Apparatus for refrigerating articles of the nature of food materials tending to give off waste materials, comprising: means defining a thermally isolated chamber having boundary walls and entrance and exit ends for passage of articles through said chamber, said boundary walls including a flat bottom wall and one side wall at one edge of said flat bottom wall forming a bottom L-shaped structure having an outer edge that is opposite said one edge and said one side wall and a top wall and a second side wall located opposite to said one side wall forming a top L-shaped structure; means mounting said top and bottom L-shaped structures for opening and closing movement relative to each other thereby to define a tunnel comprising said chamber and to expose selectively the interior of said chamber and said bottom wall and said outer edge; fluid permeable conveyor means in said chamber for said passage; and spray means in said chamber for spraying articles on said conveyor means with a liquid refrigerant, the said bottom wall being flat and smooth out to and including said outer edge for easy cleaning when said top L-shaped structure is in said open position.

4,086,784

APPARATUS FOR REFRIGERATING ARTICLES

Richard C. Wagner, Frankfort, Ill., assignor to Hollymatic Corporation, Park Forest, Ill.

Filed Dec. 15, 1976, Ser. No. 750,892
Int. Cl.[2] F25D *17/02*
U.S. Cl. 62—374 **7 Claims**



1. Apparatus for refrigerating articles, comprising: means defining a thermally isolated chamber having boundary walls and an entrance end and an exit end for passage of articles through said chamber, conveyor means in said chamber for said passage; introducing means for introducing a liquid cryogen that converts to a solid and then to a gas at a critical and decreasing pressure, said introducing means comprising a plurality of spaced pressure operated control valves each comprising a valve body, a cavity for said liquid cryogen within the valve body, a valve wall containing a flow opening for expelling liquid cryogen from said valve and a pressure operated closure member for the valve opening exposed to said valve cavity with means for moving the closure member to open said valve flow opening at a preselected pressure within said cavity that is at said critical pressure or above; liquid flow means interconnecting said plurality of control valve cavities for flow of said cryogen liquid to all said cavities; means for spacing said valves in said chamber above the conveyor and inwardly of and directed away from said chamber entrance and exit; means for spacing the valves from each other in said chamber; means for selectively supplying said liquid flow means with liquid cryogen at a pressure that is above said critical pressure; and means for spacing said conveyor means in its entirety above the bottom of said chamber to provide access for cleaning, said chamber comprising a side wall attached to the bottom of said chamber, a movable top cover and an opposite side wall attached to said cover and movable therewith thereby providing access to the bottom of said chamber when said cover and attached side wall are in raised position, said opposite side wall having the lower edge forming a closure with the adjacent edge of said bottom wall.

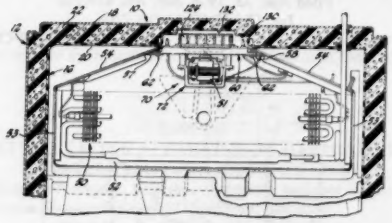
4,086,785

TWO-PIECE FAN MOTOR MOUNTING ARRANGEMENT

Donald P. Kochendorfer, and Robert S. Hanson, both of Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 17, 1977, Ser. No. 760,154
Int. Cl.[2] F25D *17/06, 11/02;* **F16F** *15/00*
U.S. Cl. 62—414 **4 Claims**

1. A two-piece mounting arrangement for supporting a fan motor on an appliance wall, said fan motor having a rotatable shaft disposed in a substantially horizontal position, an impeller supported on said shaft, first and second oppositely extending motor mounting hubs aligned on the axis of said motor shaft, said two-piece mounting arrangement comprising; a first piece in the form of a fan housing orifice molded plastic plate member having a central impeller orifice formed therein, means for supporting said plate member on the appliance wall, said plate member having a pair of integral composite bosses oriented on the transverse axis of the orifice and extending in one direction with their proximal ends molded to one face of said plate member, said bosses each having a post-like portion and an integral key-like portion, the key-like portions of said bosses being symmetrically oriented on said transverse axis in diametrically opposed inwardly facing mirror image relation, said composite bosses each defining at the juncture of their post-like portions and key-like portions longitudinally extending paired grooves symmetrically positioned on either side thereof, a transverse integral bridge member extending between said composite bosses, said bridge member having an aperture formed therein located in substantial coaxial relation with the fan motor hubs, the second mounting piece in the form of an integrally molded plastic U-shaped motor mounting clamp, said clamp including a base portion having an aperture aligned with the aperture in said bridge, resilient grommets located within the bridge and base apertures, providing aligned holes receiving and gripping the motor first and second hubs, respectively, for resiliently supporting said motor therebetween; said U-shaped mounting clamp including leg portions extending in



the opposite direction to said bosses on either side of the fan motor shaft and terminating in outwardly directed foot portions having C-sectioned complementary collars integrally molded on the underside thereof, said C-sectioned collars defining inner cavities and diametrically opposed entrances of a dimension to permit telescopic reception of the distal end of the composite bosses, each collar entrance defining a pair of shoulder portions adapted to be slidably received in the pair of grooves of its associated boss, wherein each collar entrance receives its associated composite boss key-like portion therein with its pair of collar shoulders providing a torque receiving interlock fit with their related grooves, and fastening means extending axially from each foot portion into its interlocked composite boss post-like portion, whereby said U-shaped motor mounting bracket is rigidly secured to said plate member mounting bosses to resiliently support the fan motor on the appliance wall.

4,086,786

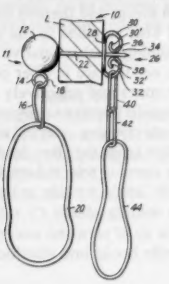
TWO PART PIERCING EARRING WITH AN ORNAMENT ON EACH PART

Arthur F. Ritter, 235 E. 87th St., New York, N.Y. 10028

Filed Sep. 7, 1976, Ser. No. 720,595
Int. Cl.[2] A44C *7/00*
U.S. Cl. 63—13 **4 Claims**

1. An earring for attachment to an ear lobe, said earring comprising: first support means and second support means, said first and second support means being adapted for sandwiching said ear lobe therebetween, said first support means including pin means for extending through said ear lobe, said first and second support means being detachably connected via said pin means for the mounting and removing of said earring, first decorative means connected to said first support means, and second decorative means connected to said second support means, whereby said first and second decorative means hang from opposite sides of the ear lobe, said first support means comprising a plurality of first links connected to said pin means, said first decorative means being suspended from said plurality of first links; said second support means comprising a retainer, said retainer comprising a retaining plate having a central opening formed therethrough, curled members extend-

ing outwardly from said retaining plate, said curled members further extending in reverse directions toward each other so as to form therebetween a passageway axially aligned with said central opening, said pin means being insertable through said



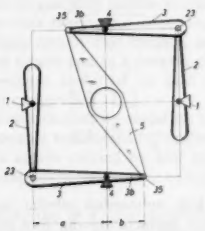
central opening such that said curled members retain said pin means in said passageway; said second support means further comprising a plurality of second links by which is suspended said second decorative means, said plurality of second links being engaged by one of said curled members.

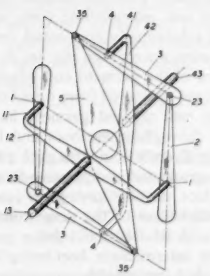
4,086,787

DEVICE FOR TRANSMITTING FORCE FROM ONE SHAFT TO ANOTHER

Wilhelm Koch, Heidelberg, Germany, assignor to Brown, Boveri and Cie AG, Mannheim, Germany

Filed Nov. 20, 1975, Ser. No. 633,705
Claims priority, application Germany, Nov. 23, 1974, 2455549
Int. Cl.[2] F16D *3/62, 23/00*
U.S. Cl. 64—10 **4 Claims**





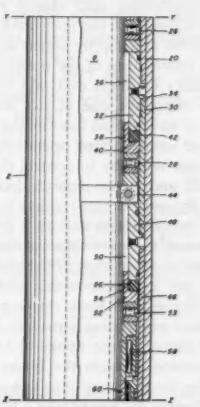
1. Device for transmitting force from one shaft to another wherein the latter is displaceable in radial and axial direction relative to the one shaft, comprising a coupler including a first pair of guide rods, one end of the guide rods of said first guide rod pair being articulatingly connected with the one shaft, the other end of said guide rods being articulatingly connected to a respective end of the guide rods of a second guide rod pair, a middle guide rod articulatingly connected at both ends thereof to the respective other end of said guide rods of said second guide rod pair, a torque output joint for the other shaft articulatingly engaging the respective guide rods of said second guide rod pair between the respective articulating connection of said middle guide rod with said guide rods of said second guide rod pair and the respective articulating connection of the respective guide rods of said first guide rod pair with said guide rods of said second guide rod pair, said middle guide rod having a longitudinal axis extending at an inclination to a line extending through the central axis of the other shaft and disposed parallel to the respective longitudinal axis of said guide rods of said second guide rod pair, in nondeflected condition of said coupler, the torque output joint, respectively, being located beyond the middle of a connecting line extending between the articulating connection of the respective guide rod of said second guide rod pair and the respective guide rod of said first guide rod pair and the articulating connection of the middle guide rod and the respective guide rod of said second guide rod pair, said guide rods of said first guide rod pair having thereon a respective torque input joint for the one shaft and having a respective elongated portion thereof extending beyond the respective torque input joint so as to be statically balanced by the mass of said elongated portion.

4,086,788

DRIVE HAVING A PLURALITY OF THRUST BEARINGS

Marion A. Garrison, Denver, Colo., assignor to Empire Oil Tool Company, Denver, Colo.

Filed Mar. 9, 1977, Ser. No. 775,828
Int. Cl.[2] F16D *3/06*
U.S. Cl. 64—23 **5 Claims**



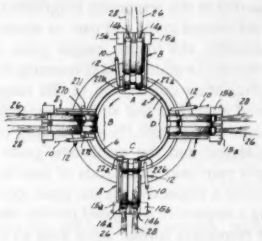
1. In a drive including a rotable shaft subjected to an axial load, a housing surrounding said shaft in spaced relationship therewith to provide a space therebetween, a pair of axially spaced thrust bearings in said space, a pair of members in said space between said thrust bearings having a circumferential chamber therebetween, said pair of members being axially movable with respect to one another to vary the size of said chamber, and a resilient but relatively non-compressible ring in said chamber having a volume less than the volume of said chamber when there is relatively little axial load on said shaft, said members being axially movable with respect to one another under load to decrease the volume of said chamber and deform said resilient ring.

4,086,789

METHOD AND APPARATUS FOR PRODUCING PATTERNED, DEEP PILE, CIRCULAR KNITTED FABRICS

James D. Golladay, Wauwatosa, and Norman C. Abler, Menominee Falls, both of Wis., assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Division of Ser. No. 358,398, May 8, 1973, Pat. No. 3,973,414. This application May 24, 1976, Ser. No. 689,065
Int. Cl.[2] D04B 9/14
U.S. Cl. 66—9 B 7 Claims



1. In a pile fabric circular knitting apparatus including a rotatable needle cylinder and reciprocatable knitting needles therein, supply means for delivering fibers to a plurality of feeding means providing zones spaced about the circumference of the cylinder wherein the fibers are picked up by certain of said knitting needles as they are selectively reciprocated into the respective zones, and yarn feed means for delivering backing yarn between certain of said zones to be picked up by the knitting needles actuated to receive said yarn, the combination which comprises: means for selectively reciprocating the individual knitting needles into said zones to cause the needles to remove fibers from the zones for transfer to knitted fabric; pattern means controlling said supply means to vary the amount of fibers supplied to the respective zones; controllable means separate from said supply means selectively regulating the cooperative relationship of the needles with the zones to modify the quantity of fibers that said knitting needles will transfer from a respective one of said zones to the knitted fabric; dynamic control means functioning with the apparatus in continuous and uninterrupted operation, for actuating said controllable means, whereby to control the density of pile in the knitted fabric; and means separate from said controllable means and said dynamic control means for reciprocating the needles to pick up yarn from said yarn feed means and integrate the fibers and the yarn into interlocking loops of the knitted fabric, said needles being of the sliding latch type each having a hook and a reciprocatable sliding latch movable between hook closing and hook opening position, and said controllable means comprising structure for controlling the sliding latches relative to the hooks to be selectively in the hook closing position wherein the hooks remain inactive in respect to the fiber feeding zone or to be selectively in the hook open position wherein the hooks take a full load of fiber from the fiber feeding zone or to be selectively in a partially open hook position wherein the hooks are regulated to take a lesser quantity of fiber from the fiber feeding zone, while the needles are in fiber picking up position in the respective zones.

7. A method of knitting pile fabric, comprising:

operating a circular knitting apparatus including a rotatable needle cylinder and reciprocable needles of hook and slide latch type therein;

delivering fibers from supply means to a plurality of feeding means providing zones spaced about the circumference of the cylinder wherein the fibers are adapted to be picked up by certain of the knitting needles as they are selectively reciprocated into the respective zones;

delivering backing yarn between certain of said zones to be picked up by the knitting needles actuated to receive said yarn;

selectively reciprocating the individual knitting needles into said zones to cause the needles to remove fibers from the zones to transfer to knitted fabric;

operating pattern means and thereby controlling delivery of the amount of fiber supplied to the respective zones;

controlling the sliding latches relative to hooks of the needles while the needles are in fiber picking up position in the respective zones and selectively closing selected needle hooks to remain inactive in respect to the fiber feeding zones, selectively opening selected needle hooks to take a full load of fiber from the fiber feeding zones and selectively partially opening selected needle hooks and regulating such needle hooks to take a lesser quantity of fiber from the fiber feeding zones;

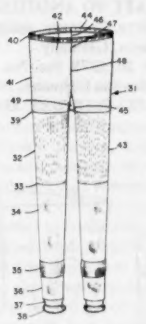
and effecting pick up of yarn and integrating the fibers in the respective needle hooks into interlocking loops of knitted fabric.

4,086,790

THERAPEUTIC GARMENT AND METHOD

James R. Hanrahan, Jr., Fairfield, Conn., and Richard G. Levine, Lawrence, N.Y., assignors to A.I.R. Industries, Inc., Fairfield, Conn.

Filed Sep. 30, 1975, Ser. No. 618,180
Int. Cl.[2] D04B 11/00
U.S. Cl. 66—178 A 13 Claims



1. A circular knit unboarded tubular tapered non-reciprocated therapeutic garment having foot and boot portions, said boot portion having alternate wales with stitches of non-elastomeric yarns connect with intermediate stitches of elastomeric yarn in each said intermediate wale, said elastomeric yarn stitches being substantially dominated, covered and protected by said non-elastomeric yarn stitches in the relaxed and stretched conditions of the garment and whereby said elastomeric yarn stitches are protected from direct contact with the leg of the wearer, said tapered garment having graduated stitches extending throughout the boot and foot portions in increments varying directly with the girth of the leg of the wearer to provide graduated compressive force on the leg of the wearer, said foot portion having an intermediate heel-instep circumferential band of the same knitted structure as said boot portion with less retractive force generated by said stitches within the intermediate heel-instep circumferential band than the stitches immediately preceding and following said band producing a slightly enlarged bulging area extending outwardly from the tapered contour of said garment in the relaxed fabric condition relative to said boot portion, said stitches throughout said intermediate heel-instep circumferential band are all of uniform increased length of equal size relative to the stitches in the boot portions adjacent thereto, said foot portion having a closed toe portion with the major section of said toe portion having the same knitted construction as said

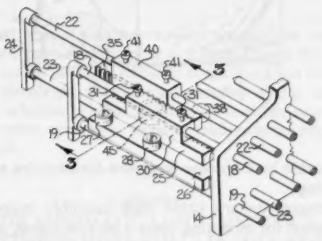
boot portion with stitches of the non-elastomeric and elastomeric yarns being more dense and shorter than any of the stitches in any portion of the boot, said toe portion further provided with a toe section having a series of courses of stretchable non-elastomeric yarns forming a band of relatively sheer stretchable fabric whereby reduced stress is placed on the toes of the wearer.

4,086,791

REVERSE RACKING MECHANISM FOR WARP KNITTING MACHINE

Robert J. Gangi, Emerson, N.J., assignor to Joan Manufacturing Corporation, Waldwick, N.J.

Filed Jul. 22, 1977, Ser. No. 817,923
Int. Cl.² D04B *23/00*
U.S. Cl. 66—207 **5 Claims**



1. In a warp knitting machine including a row of needles, adjacent first and second carrier rod means supported for parallel movement relative to said needles, weft inlay yarn feed means carried by each of said first and second carrier rod means, and pattern control means for imparting step-by-step racking movement to said first carrier rod means for inlaying weft yarns in the knit fabric, the combination therewith of means for imparting step-by-step racking movement to said second carrier rod means and in a reverse direction from the step-by-step movement imparted to said first carrier rod means, said means comprising

(a) first rack means carried by said first carrier rod means and being movable with said first carrier rod means,

(b) second rack means carried by said second carrier rod means and being operable to move said second carrier rod means, and

(c) a pinion supported in a fixed position for rotation between and in engagement with said first and second rack means said pinion being rotated when said pattern control means inparts step-by-step racking movement to said first carrier rod means and to said first rack means to thereby transmit a similar racking movement but in a reverse direction to said second rack means and to said second carrier rod means.

4,086,792

WEFT INLAY RACKING CONTROL

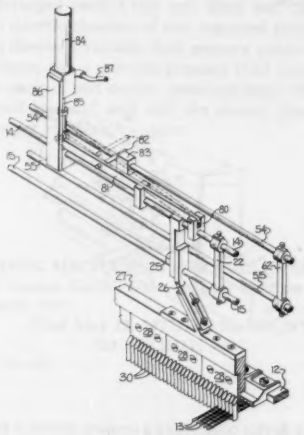
Robert J. Gangi, Emerson, N.J., assignor to Joan Manufacturing Corporation, Waldwick, N.J.

Filed Aug. 3, 1977, Ser. No. 821,616
Int. Cl.² D04B *27/26*
U.S. Cl. 66—207 **6 Claims**

1. In a warp knitting machine including a row of needles, first carrier rod means supported for parallel movement relative to said needles, weft inlay yarn feed means carried by said first carrier rod means, and a first pattern chain for imparting a limited range of step-by-step racking movement to said carrier rod means for inlaying weft yarns over a limited transverse range across the knit fabric, the combination therewith of means for increasing said limited racking movement of said first carrier rod means, said means comprising

(a) auxiliary carrier rod means supported adjacent said first carrier rod means for parallel movement relative to said needles and said first carrier rod means,

(b) a second pattern chain for imparting a limited range of racking movement to said auxiliary carrier rod means,



(c) latch means for selectively engaging said auxiliary carrier rod means with said first carrier rod means for transmitting additional racking movement to said first carrier rod means after said first carrier rod means has reached the end of its limited transverse range, and

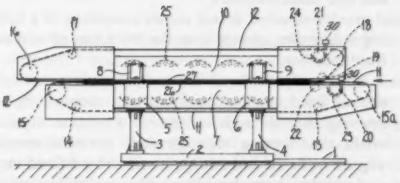
(d) control means for selectively operating said latch means.

4,086,793

DEVICE FOR MOISTENING AND CONDITIONING LEATHER AND THE LIKE

Gerd Meyer, Mulheim, Rhur, Germany, assignor to USM Corporation, Farmington, Conn.

Filed Mar. 31, 1977, Ser. No. 783,205
Claims priority, application Germany, Apr. 7, 1976, 2615131
Int. Cl.² C14B *1/00*
U.S. Cl. 69—32 **8 Claims**



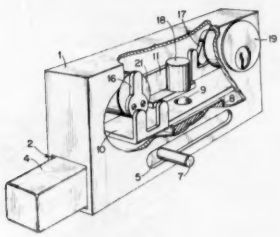
1. Apparatus for moistening and conditioning of sheet material, for example leather, comprising two presser members having flat presser surfaces situated opposite each other, power means connecting the presser members and by which the presser members may be moved relatively towards each other to exert pressure on the sheet material disposed therebetween and apart to relieve the pressure, heating means for heating at least one of the flat surfaces, at least one conveyor belt passing between the surfaces, drive means by which the belt can be moved while the surfaces are spaced apart by the power means to transport sheet material on the belt to the region between the flat presser surfaces for pressing by the flat presser surfaces and for carrying the sheet material out of the region after it has been pressed, and means for moistening the belt before it enters the region between the flat presser surfaces.

4,086,794

GATE LOCK MECHANISM

Fred F. Richards, 6837 Chevy Chase, Dallas, Tex. 75225

Filed Jul. 6, 1976, Ser. No. 702,708
Int. Cl.[2] E05B 65/06
U.S. Cl. 70—134 2 Claims



1. A locking device comprising a housing having a first fixed member therein,

a second fixed member spaced apart from and parallel to the first fixed member,

a movable member slideably sandwiched between the first and second fixed members,

a bolt extending through said housing slideably adjacent and parallel to the second fixed member, extending axially beyond at least one end of said housing, and having means intermediate the ends thereof for cooperation with a detent means in said members,

said detent means comprising gravity-actuated means in said members for cooperation with said detent cooperation means on said bolt to prohibit movement of said bolt when the latter is in at least one position relative to said fixed members, means for positively retaining said detent means in contact with said detent cooperation means on said bolt to positively prohibit relative movement between said bolt and said fixed members,

said gravity-actuated detent means consisting of a ball having a diameter greater than the thickness of said second fixed member,

said ball loosely confined in a hole extending through said second fixed member, said movable member having an opening therethrough to receive a portion of said ball when the opening through said movable member is aligned with the hole through said second fixed member, said opening through said movable member being covered and obstructed on one side by said first fixed member, said detent cooperating means in said bolt being adapted to receive a portion of said ball, means for slideably actuating said movable member to confine said ball in a mutual cavity consisting of said hole in second fixed member and detent cooperating means in said bolt,

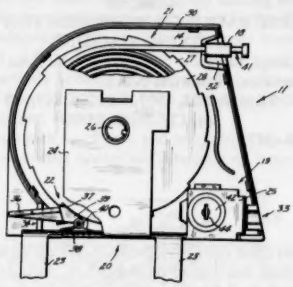
said means for slideably actuating said movable member comprising at least one cam engaging means on said movable member, a pair of cams mounted on opposite inside surfaces of said housing rotatable in cooperation with said cam engaging means and driven by a pair of cam operating means each operable from their respective side of said housing, said movable member being slideably actuated by either of said cams acting upon said cam engaging means to cause the alignment or misalignment of said opening in said movable member with said hole in said second fixed member.

4,086,795

CABLE LOCK STORAGE STRUCTURE

Ronald Charles Foster, Lake Orion, and Regis Victor Pilarski, Utica, both of Mich., assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Feb. 26, 1976, Ser. No. 661,833
Int. Cl.[2] B02H 5/00
U.S. Cl. 70—233 4 Claims



1. A cable lock storage structure for bicycles and the like comprising:

an integral unitary cable lock assembly support chassis adapted for mounting upon a bicycle frame, said support chassis provided with compression clamp extensions which clampably engage a bicycle frame ;

a pair of housing members which matingly engage to substantially enclose said support chassis therebetween, said matingly engaged housing members forming a housing structure for said integral cable lock assembly support chassis, said housing structure provided with lever actuator arm, compression clamp extension, locking cable and tongue element lock assembly access openings;

a reel retractor assembly rotatably mounted on said support chassis within said housing structure, said reel retractor assembly provided with a spring actuated retractor assembly, said reel retractor assembly having at least one toothed ratchet wheel;

a spring loaded pawl lock assembly provided on said support chassis within said housing structure proximate to said reel retractor assembly, said pawl lock assembly provided with a lever actuator arm which extends outwardly from said housing structure through said lever actuator arm access opening, said pawl lock assembly adapted for selected engagement and disengagement with said toothed ratchet wheel of said reel retractor assembly;

a locking cable mounted on said reel retractor assembly, said locking cable being selectively extendable from and automatically retractable into said housing structure through said locking cable access opening, said locking cable provided with a lock-engaging tongue element at the free end thereof; and

a tongue element lock assembly provided on said support chassis in said housing proximate to said tongue element lock assembly access opening, said tongue element lock assembly adapted to lockably engage said locking cable tongue element inserted therein through said tongue element lock assembly access opening.

4,086,796

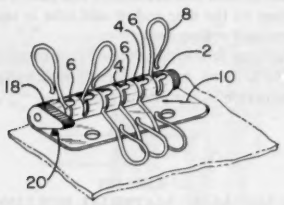
KEY CASE HEAD

Oskar Alexander Hellwig, Springfield, Mass., assignor to Beatrice Foods Co., Chicago, Ill.

Filed Jun. 3, 1977, Ser. No. 803,300
Int. Cl.[2] A47G 29/10
U.S. Cl. 70—456 B 6 Claims

1. Key Case Head comprising a first generally cylindrically-

shaped outer member having slot means extending circumferentially thereof, each slot of said slot means having an opening in communication therewith but offset therefrom, each of said slots being adapted to movably retain a key hook and each of said offset openings being adapted to permit a key hook to pass therethrough, and a second member disposed within said first



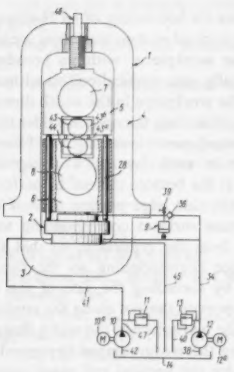
member, said second member having second slot means in alignment with said first member slot means, each slot of said second slot means having a recess in communication therewith but offset therefrom, said second member being rotatably movable to selectively align said second member recess with said first member opening to permit withdrawal or entrance of said key hook.

4,086,797

DEVICE FOR AUTOMATIC ADJUSTMENT OF A ROLL GAP BETWEEN WORK ROLLS IN MILL STAND

Vladimir Nikolaevich Vydrin, ulitsa Timiryazeva, 28, kv. 27; Vladimir Georgievich Dukmasov, ulitsa Soni Krivoi, 77, kv. 5; Garifulla Davlyatshin, prospekt Komsomolsky, 15, kv. 100, all of Chelyabinsk, and Oleg Ivanovich Tischenko, prospekt Lenina, 6/2, kv. 6, Temirtau Karagandinskoi oblasti, all of U.S.S.R.

Filed May 16, 1977, Ser. No. 797,076
Int. Cl.[2] B21B *37/12*
U.S. Cl. 72—20 **1 Claim**



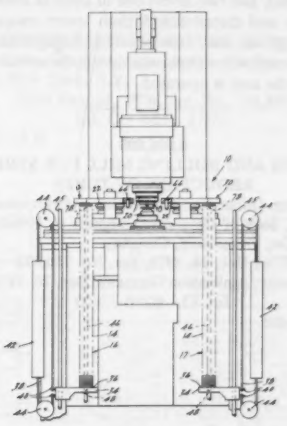
1. A device for automatic adjustment of a roll gap between working rolls in a mill stand, comprising two similar parts operating on an identical principle, one part being arranged on each side of the mill stand, each of said parts comprising a two-chamber hydraulic cylinder for prestressing the mill stand, said hydraulic cylinder including a shell and a piston fitted with two rods, a first of said rods interacting with a roll housing cross bar, said shell interacting with a support member of one of said working rolls; a load cell for absorbing a rolling force arranged within a second of said piston rods of said hydraulic cylinder and being free from the effect of the mill stand prestressing force, said load cell interacting with a support member of the other working roll, a chamber of said load cell communicating with a first of the chambers of said two-chamber hydraulic cylinder; a regulated pressure valve arranged within said two-chamber hydraulic cylinder and having a throttle chamber communicating with a second chamber of said hydraulic cylinder and a control chamber combined with the chamber of said load cell; a variable-pressure fluid source arranged outside said mill stand and communicating with the throttle chamber of said regulated pressure valve to maintain therein a variable fluid pressure proportional to the rolling force; and a constant-pressure fluid source, for each operable parts of said device, communicating with the chamber of said load cell and with the second chamber of said two-chamber hydraulic cylinder.

4,086,798

LOADING MECHANISM FOR PULLEY SPLITTER

Anthony Lemmo, Euclid, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed May 12, 1977, Ser. No. 796,297
Int. Cl.[2] B21H *9/00*
U.S. Cl. 72—82 **13 Claims**



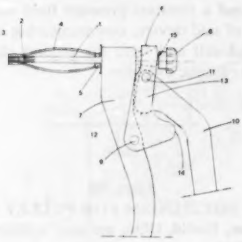
1. An apparatus for manufacturing split pulleys comprising: a two piece work holder for supporting a blank to be split at a work station and rotating said blank about a longitudinal axis through the work holder; a splitting tool supported for relative movement towards and away from the work holder along a path perpendicular to the longitudinal axis of the work holder to engage the peripheral edge of the blank and split a portion of the blank; a feed path disposed perpendicular to the longitudinal axis for delivering a blank to the work holder; a magazine adapted to hold a plurality of blanks to be split into pulleys; a slide assembly including a slide member, locating means for locating a blank to be split on said slide assembly in a predetermined position and means for moving the slide member linearly along the feed path to position the blank at said work station where the blank can be grasped by the work holder; and a pivoting loading arm having a first end rotatably disposed about a pivot point and a second end having gripping means attached thereto, the arm being rotatable between a first pick-up position in which the arm and gripping means are disposed contiguous to a blank in the magazine and a second position wherein the arm and gripping means are disposed contiguous to the locating means, the gripping means being adapted to engage and remove a blank from the magazine when said arm is in the first position and release the blank on the locating means when said arm is in the second position.

4,086,799

INSTALLATION TOOL FOR TAPPED PLUGS

Robert Brendle, 14 rue du Ballon, 68300 Saint Louis, France

Filed Mar. 7, 1977, Ser. No. 775,410
Claims priority, application France, Mar. 11, 1976, 76 06990
Int. Cl.[2] B25D 7/00; B25B 7/00
U.S. Cl. 72—114 4 Claims



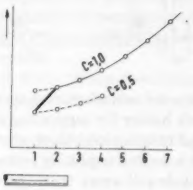
1. An installation tool for securing tapped plugs in place comprising: a rod threaded at one end and provided with a stop at the other end, and two levers one of them at least including a passage for said threaded rod, both levers cooperating together through at least two separate engagement surfaces which act successively as fulcrums during the movement of the levers when the tool is operated.

4,086,800

PROCESS AND ROLLING MILL FOR STRETCH REDUCTION OF TUBES

Werner Demny, Dusseldorf-Oberkassel, and Hermann Moltner, Dusseldorf, both of Germany, assignors to Friedrich Kocks GmbH & Co., Dusseldorf, Germany

Filed Dec. 14, 1976, Ser. No. 750,374
Claims priority, application Germany, Dec. 20, 1975, 2557707
Int. Cl.[2] B21B 17/00
U.S. Cl. 72—205 4 Claims



1. In a process for rolling tube with a stretch-reduction rolling mill having a plurality of successive roll stands, said stands each constituting a roll pass, the improvement comprising:

applying maximum traction or axial forces on a tube at the ends thereof to reduce the thickness thereof, said maximum traction forces being determined by the equation $R = \frac{1}{2}$ (WD-CD), where R represents the roll radius, D the external diameter of a tube, WD the ideal roll diameter and C a value indicative of roll peripheral speed, said maximum traction force determined from said equation being applied to a front end of said tube in each successive roll pass of several front stands,

reducing said traction force in each said successive roll pass of said several front stands after said front end of said tube has entered a next succeeding stand of said several front stands, said traction force remaining constant in each said successive stand in which the traction force has been reduced whereby tension is exerted on the front end of said tube in said several front stands,

reducing said traction force in all roll passes succeeding said front stand, before a rear end of said tube leaves a stand succeeding a next preceeding stand until the next to last stand of said rolling mill, said traction force remaining constant in each said successive roll pass whereby tension is exerted on the rear end of said tube in said stands until it leaves said rolling mill,

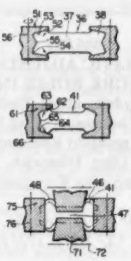
said reductions in traction force being manifested by a decrease in C value, which decrease in C value is indicative of a reduction in peripheral speeds.

4,086,801

H-SHAPE METALLIC MATERIAL ROLLING PROCESS

Koe Nakajima, Nakama; Kazuo Watanabe, and Hideki Tokita, both of Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 30, 1977, Ser. No. 782,821
Claims priority, application Japan, Mar. 31, 1976, 51-34305
Int. Cl.[2] B21B 1/12
U.S. Cl. 72—234 4 Claims



1. A process for hot rolling of an H-shape metallic material from a workpiece of rectangular cross section comprising:

feeding the workpiece, with its broader sides extending horizontally, into vertical roll stand means,

reducing the workpiece in the width direction thereof while wedgewise knifing the opposed sides thereof by the vertical roll stand means including rolls formed with a first pair of grooves each having a wedge-shaped projection formed at the bottom thereof to perform the function of knifing the side edge portion thereof by freeing the top and bottom surfaces corresponding to the web portion thereof from the reduction, so that the portion of the workpiece corresponding to the flange thereof is deformed by spreading the side of the wedge-shaped depressed portion thereof along the contour of the grooves,

reducing the workpiece in the width direction thereof while spreading the wedge-shaped depressed side edge portion thereof by the vertical roll stand means including rolls formed with a second pair of grooves each having a wedge-shaped projection which is more obtuse than the projection formed in the first pair of grooves at the bottom to perform the function of reducing by freeing the top and bottom surfaces corresponding to the web portion of the workpiece from the reduction, so that the portion of the workpiece corresponding to the flange is deformed by spreading the side of the wedge-shaped depressed portion thereof along the contour of the grooves; and

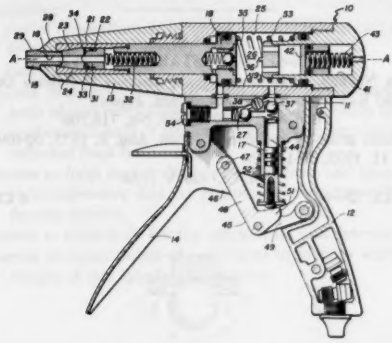
subsequently vertically reducing the web portion of the workpiece by horizontal rolls in universal rolling mills, and meanwhile transversely reducing the flange portions of the workpiece by vertical rolls in the universal rolling mills.

4,086,802

RIVET GUN

John F. Ewig, Jr., Worcester, Mass., assignor to Parker Manufacturing Company, Worcester, Mass.

Filed Jan. 28, 1977, Ser. No. 763,284
Int. Cl.[2] B21J *15/34*
U.S. Cl. 72—391 15 Claims



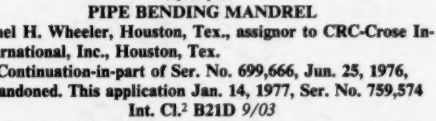
1. A rivet gun for use with a hollow rivet having a mandrel, comprising:
(a) a main body having a hand grip and an elongated barrel,
(b) a squeeze lever pivotally attached to the main body adjacent the hand grip,
(c) a rivet anvil mounted on one end of the barrel, the anvil having a mandrel-receiving bore concentric with an axis extending longitudinally of the barrel,
(d) a pump piston carried in the handle and operable by the squeeze lever,
(e) a main piston slidable in a bore in the barrel concentric with the said axis, and having a gripper cone attached thereto with a bore formed therein with a conical portion,
(f) a mandrel gripper jaw movable in the said conical portion of the gripper cone bore for movement toward and away from the rivet anvil,
(g) a reservoir formed in the barrel for retaining a body of hydraulic fluid,
(h) a check valve between the pump piston and the main piston, and
(i) a safety release valve located in the main piston and a finger is fixed relative to the barrel to engage and operate the release valve at an extreme positon of travel of the main piston.

4,086,803

PIPE BENDING MANDREL

Lionel H. Wheeler, Houston, Tex., assignor to CRC-Crose International, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 699,666, Jun. 25, 1976, abandoned. This application Jan. 14, 1977, Ser. No. 759,574
Int. Cl.[2] B21D *9/03*
U.S. Cl. 72—466 11 Claims



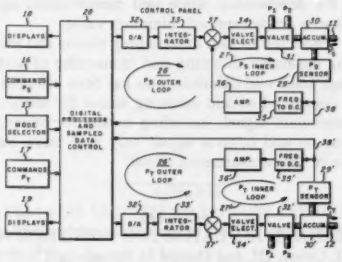
1. A pipe supporting mandrel comprising:
a plurality of generally tubular shaped housing assemblies connected in end-to-end relationship, each of said housing assemblies comprising a plurality of segments having a tapered interior surface;
a plurality of members, each of said members positioned within one of said segmented housing assemblies to engage the tapered surface thereof;
means for interconnecting said members to position each of said members in substantially the same relative position with respect to its respective segmented housing assembly; and
means for simultaneously moving said members relative to their respective segmented housing assemblies between a first position wherein said members force said segments outwardly into a pipe supporting position and a second position wherein said members allow said segments to inwardly retract.

4,086,804

PRECISION PNEUMATIC PRESSURE SUPPLY SYSTEM

Joseph H. Ruby, Glendale, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 26, 1976, Ser. No. 735,249
Int. Cl.[2] G01L *27/00*
U.S. Cl. 73—4 R 16 Claims

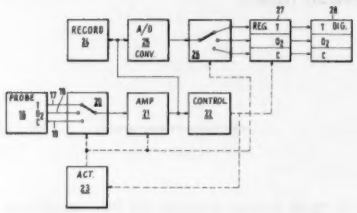


1. A controllable precision pneumatic pressure supply system for use in testing pneumatic apparatus comprising
pneumatic means for supplying a controllable pneumatic pressure to the apparatus under test and including pressure responsive means for supplying a measure of said pressure,
a precision digital closed loop control including means for providing a digital representation of a desired supply pressure, means for supplying a digital representation of the pressure supplied by said pressure responsive means, digital means for comparing said measures and providing a digital measure of the error therebetween, and means responsive to said digital error measure for providing an analog error signal proportional thereto,
a high response, high resolution analog closed loop control including means responsive to said analog error signal, means for supplying an analog signal representative of the pressure supplied by said pressure responsive means, and summing means responsive to said analog signals for controlling said pneumatic means in a manner to reduce any difference between said analog error signal and said pressure responsive means analog signal to zero,
whereby the pressure supplied to said apparatus under test corresponds to the digital representation of said desired pressure.

4,086,805
APPARATUS FOR EVALUATING MEASUREMENT SIGNALS

Eckart Kinderling, Tecklenburg; Herwig Erauw, Osnabruck; Alfons Rudolf, Ibbenburen, and Helmut Klintworth, Tecklenburg, all of Germany, assignors to Keller Spezialtechnik-Pyro Werk GmbH, Ibbenburen-Laggenbeck, Germany

Filed Apr. 12, 1976, Ser. No. 675,854
Claims priority, application Germany, Apr. 15, 1975, 2516344
Int. Cl.[2] G01K *7/14;* G01R *19/16*
U.S. Cl. 73—359 R 28 Claims

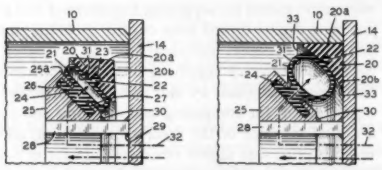


1. In apparatus for analyzing a measurement signal of a transducer probe having an initial transient issuing into a more stationary value, the improvement comprising in combination:
means for monitoring the rate of change of said measurement signal for generating a control signal when said rate of change falls below a predetermined value;
means connected to said monitoring means for initiating an analysis of said measurement signal in response to said control signal;
means for determining when said measurement signal has reached a predetermined minimum value;
means connected to said determining means and said monitoring means for disabling said monitoring of said rate of change until said determination has been effected; and
means connected to said initiating means for analyzing said measurement signal, including means for storing in response to said control signal only said more stationary value of the measurement signal.

4,086,806
SEAL AND ACTUATOR FOR PIPE TESTING

George H. Covey, III, and Donald D. Stenabaugh, both of Pawling, N.Y., assignors to The Presray Corporation, Pawling, N.Y.

Filed Jan. 28, 1977, Ser. No. 763,311
Int. Cl.[2] G01M *3/28*
U.S. Cl. 73—49.5 7 Claims

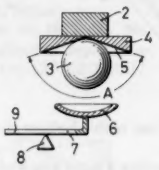


1. In an apparatus for pressure testing open-ended pipes of the like, means to provide a sealing relation between an open end of said pipe and an end plate of a pipe supporting test fixture, which comprises
a. a continuous annular, yieldable delta seal member,
b. annular, expandable actuator means associated with and supporting said delta seal member,
c. mounting means for supporting said actuator means and said continuous delta sealing member on said end plate,
d. said support means being so configured and arranged as to position said delta seal member means spaced from the junction between said open-ended pipe and said end plate, and
e. said actuator means being operative to expand said delta seal member along a conical envelope toward said junction, whereby the delta sealing member is wedged into said junction to provide a sealed relationship between said open-ended pipe and said end plate.

4,086,807
QUAKE-SENSING STARTING DEVICE

Tohru Nakada, Yokahama, Japan, assignor to Subaru Denshi Seiki Kabushiki Kaisha, Kamakura, Japan

Filed Aug. 2, 1976, Ser. No. 710,706
Claims priority, application Japan, Aug. 5, 1975, 50-094767; Nov. 11, 1975, 50-134726
Int. Cl.[2] G01V *1/16*
U.S. Cl. 73—652 6 Claims

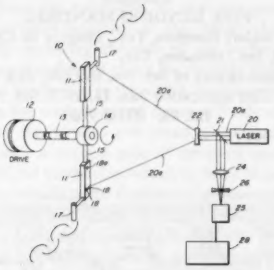


1. A quake-sensing starting device comprising;
a magnet supported by a retainer fitting;
a separator member made of a non-magnetic material fixed to the lower surface of said magnet;
a conical recess of an opening degree of 140° to 170° formed on the lower surface of said separator member;
a steel ball adsorbed to the center of said recess;
a receiving dish provided underneath said steel ball maintaining a distance; and
means which convert the downward displacement of the receiving dish caused by the falling steel ball thereto into a starting force.

4,086,808
MOTION DETECTION AND MEASUREMENT

Morton Camac, Lexington, and Fritz Bien, Arlington, both of Mass., assignors to Aerodyne Research, Inc., Bedford, Mass.

Filed Jul. 26, 1976, Ser. No. 708,307
Int. Cl.[2] G01B *9/02;* G01N *21/22*
U.S. Cl. 73—655 14 Claims



1. A method of monitoring vibration and other motion in a moving mechanical element comprising;
mounting on said element two retroreflectors, a first retroreflector being mounted at a first location where motion relative to second location is to be monitored and a second retroreflector being mounted at said second location removed from said first location,

directing coherent radiation from a radiation source onto both of said retroreflectors simultaneously for a substantial continuous period of time, whereby beams of said coherent radiation are reflected back upon themselves by each of said retroreflectors,

and comparing said reflected beams.

14. Apparatus for monitoring vibration of a rotating blade comprising;

a pair of retroreflectors mounted on said blade at two spaced locations where vibration is to be monitored,

a laser,

means to direct a beam from said laser simultaneously to both of said retroreflectors during blade rotation through a substantial path of motion, whereby two laser beams are reflected back on themselves,

means to form an interference pattern from said beams,

a photoresponsive detector positioned to receive said interference pattern,

means to receive an electric signal from said detector, and

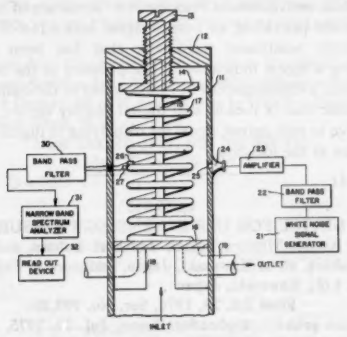
means to count pulses of said signal to identify shifting of fringes of said interference pattern.

4,086,809

ACOUSTIC NON-INTRUSIVE METHOD FOR CHECK OF THE SET POINT OF A SPRING-LOADED MECHANICAL DEVICE

Peter T. K. Wu, Clifton Park, and John R. M. Viertl, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 24, 1977, Ser. No. 761,533
Int. Cl.[2] G01L *1/10*
U.S. Cl. 73—161 **10 Claims**



1. A non-intrusive acoustic method for determining the set point of a loaded spring in a spring-loaded mechanical device comprising the steps of:

coupling acoustic vibrations at a plurality of frequencies to said loaded spring to excite selected vibration modes thereof,

sensing the mechanical vibrations of said loaded spring and generating at least one electrical signal representative of said spring vibrations,

filtering said electrical signal to pass a predetermined range of frequencies, and

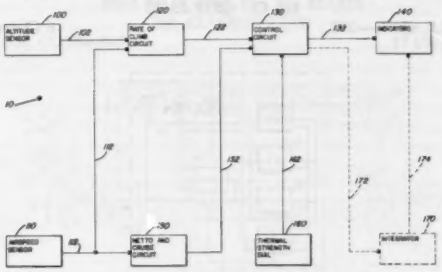
processing said filtered electrical signal to derive the resonant frequency of each selected vibration mode as an indication of the associated set point of said mechanical device at which the force loading said spring is overcome.

4,086,810

AIRCRAFT INSTRUMENT

Richard Harding Ball, 2140 Kohler Dr., Boulder, Colo. 80303

Filed Sep. 22, 1976, Ser. No. 725,385
Int. Cl.[2] G01C *21/10*
U.S. Cl. 73—179 **19 Claims**



1. An aircraft instrument comprising:

means responsive to the altitude change of said aircraft for generating a first electrical signal, said first signal being proportional to said altitude change,

means responsive to the airspeed change of said aircraft for generating a second electrical signal, said second signal being proportional to said airspeed change, and

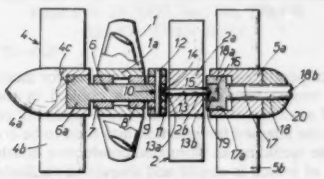
means operative upon receipt of said first and second signals for indicating a modified rate of climb of said aircraft, said modified rate of climb signal being representative of the true rate of climb of said aircraft less the rate of climb due to control motions of said aircraft.

4,086,811

SYSTEM FOR MOUNTING ROTARY COMPONENTS

Pierre Marie Marcel Penet, 4 Rue de Bourgogne, Creteil, France (94)

Filed Feb. 1, 1977, Ser. No. 764,574
Claims priority, application France, Feb. 2, 1976, 76 02712
Int. Cl.[2] G01F *1/10*
U.S. Cl. 73—231 R **12 Claims**

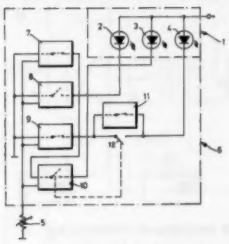


1. A system for mounting a first and a second rotor for coaxial rotation in a stator, the system comprising a first and a second support secured in the stator in spaced apart relation, a stationary shaft secured in cantilever fashion coaxially within the stator by the first support, means mounting the first rotor for rotation on said stationary shaft, a first bearing formed at the free end of the stationary shaft and a second bearing secured by the second support coaxially with the stationary shaft, and a rotary shaft secured to the second rotor and rotatably mounted in the first and the second bearings.

4,086,812
DISPLAY DEVICE

Helmut Lüthe, and Otto Schönemann, both of Wolfsburg, Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany

Filed Mar. 11, 1977, Ser. No. 776,539
Claims priority, application Germany, Apr. 6, 1976, 2614712
Int. Cl.[2] G01F *23/10*
U.S. Cl. 73—308 6 Claims

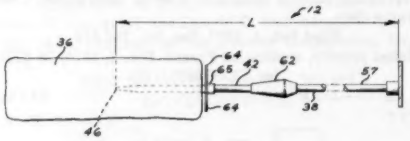


1. Apparatus for displaying the value of a measured quantity, for use in connection with a sensor element having an output signal representative of said quantity, comprising an indicating unit having a plurality of variously colored luminous display elements, each representative of a primary value range of said quantity, and display driving means, responsive to said sensor output signal, for activating individual ones of said display elements when said sensor output signal represents selected primary value ranges of said quantity and for activating adjacent ones of said display elements simultaneously when said sensor output signal represents intermediate value ranges of said quantity.

4,086,813
MICROWAVE OVEN FOOD TEMPERATURE SENSING PROBE ASSEMBLY INCLUDING A REFLECTOR

Flora L. Meek, and Richard E. Hornung, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 22, 1975, Ser. No. 643,092
Int. Cl.[2] G01K *1/08*
U.S. Cl. 73—352 8 Claims



1. A temperature-sensing probe assembly for monitoring the internal temperature of food being cooked in the cooking cavity of a microwave oven, said probe assembly comprising:

a. a probe adapted for insertion into food to be cooked, said probe including an elongated conductive housing, the tip end of which is closed and shaped to facilitate insertion into the food, and said probe further including a temperature sensing electrical element positioned internally of the housing near the tip end;

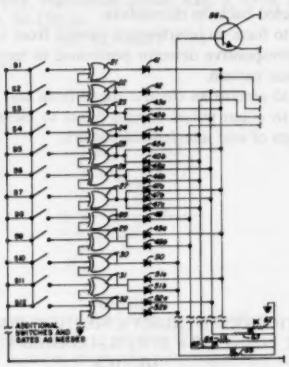
b. a flexible shielded cable for connecting said electrical element to circuitry responsive to thermally induced changes in a characteristic of said electrical element, the cable shield being electrically connected at one end to the connection end of said probe housing and adapted at the other end for connection to a wall of the cooking cavity, said probe housing and the cable shield thereby cooperating to form a continuous conductive sheath from the tip of said probe housing to the other end of said cable; and

c. an electrically conductive microwave energy reflector mounted on said continuous conductive sheath adjacent to, but spaced from, the food to reduce the amount of microwave energy which enters the food in the region immediately adjacent said probe housing.

4,086,814
PRESSURE SENSING SYSTEM

Harold C. Wickman, 17619 Mulberry Dr., Country Club Hills, Ill. 60477, and James M. Taylor, Chicago, Ill., assignors to Harold C. Wickman, Country Club Hills, Ill.

Filed Mar. 21, 1977, Ser. No. 779,544
Int. Cl.[2] G01L *9/00*
U.S. Cl. 73—717 12 Claims



1. Apparatus for displaying pressure in digital form, which comprises: a plurality of pressure-sensitive transducers arranged for positioning within a location wherein the pressure is to be sensed, said pressure-sensitive transducers being arranged from a most sensitive position to a least sensitive position; electronic matrix means responsive to actuation of said transducers for providing an output signal indicative of the least sensitively positioned transducer that has been actuated, whereby a signal indicative of the pressure at the location is provided; a digital display device coupled to the output of said electronic matrix means, said digital display device being responsive to said output signal for displaying in digital form the pressure at the location.

4,086,815
DEVICE FOR USE IN SENSING PRESSURES

Isamu Asano; Mitsuru Tamai; Tadanori Yuhara, and Takeshi Yasuhara, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Jul. 23, 1976, Ser. No. 708,251
Claims priority, application Japan, Jul. 24, 1975, 50-90523; Oct. 29, 1975, 50-130041
Int. Cl.[2] G01L *9/12*
U.S. Cl. 73—721 11 Claims

1. A device for use in sensing differential pressure comprising,

a. a casing defining an internal casing space therein,

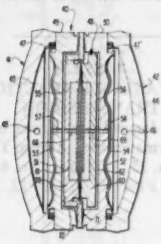
b. a differential pressure detecting portion having a sensing diaphragm mounted within an internal space thereof hermetically dividing said detecting portion internal space into first and second sensing chambers,

c. means for preventing distortion of said sensing diaphragm in response to an overpressure condition, said means comprising a flexible supporting diaphragm supporting said differential pressure detecting portion within said casing internal space and hermetically dividing said casing internal space into first and second cavities,

d. first and second pressure receiving diaphragms positioned with respect to said casing to define first and second pressure receiving chambers, respectively,

e. first and second fluid passages for providing communications between said first cavity and said first sensing chamber and between said second cavity and said second sensing chamber, respectively,

f. first and second communicating bores for providing communications between said first pressure receiving chamber



and said first cavity and between said second pressure receiving chamber and said second cavity, respectively, and

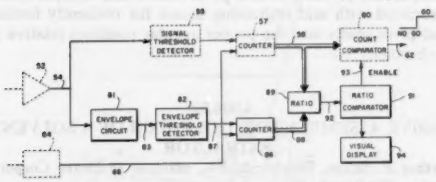
g. a filler liquid filled into said first and second sensing chambers, said first and second cavities, and said first and second pressure receiving chambers, whereby a difference in pressures acting on said first and second pressure receiving diaphragms may electrically be detected as a deflection of said sensing diaphragm.

4,086,816

METHOD AND APPARATUS FOR DISTINGUISHING STRESS WAVE EMISSIONS FROM MECHANICAL NOISE

Min-Chung Jon, Cranbury; Charles Andrew Keskimaki, Plainsboro, and Sotirios John Vahaviolos, West Windsor Township, Mercer County, all of N.J., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Jun. 22, 1977, Ser. No. 808,833
Int. Cl.[2] G01N *29/00*
U.S. Cl. 73—587 **11 Claims**



1. A method of determining, during an operation, whether a detected signal is mechanical noise or a stress wave emission signal, comprising the steps of:

(*a*) counting the number of excursions of the detected signal above a preset threshold;

(*b*) counting the number of excursions above a preset threshold made by an envelope of the detected signal;

(*c*) forming a ratio of the count of step (*a*) to the count of step (*b*); and

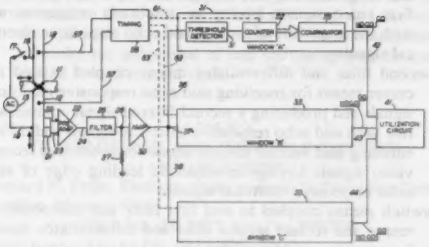
(*d*) comparing said ratio with known ranges of ratio values to determine whether the detected signal is mechanical noise or a stress wave emission signal.

4,086,817

METHOD AND APPARATUS FOR DETERMINING THE ACCEPTABILITY OF A WELD FORMED BY APPLYING REPETITIVE PULSES OF ENERGY TO THE WELD SITE

Min-Chung Jon, Cranbury, and Charles Andrew Keskimaki, Plainsboro, both of N.J., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Jul. 5, 1977, Ser. No. 813,025
Int. Cl.[2] G01N *29/00*
U.S. Cl. 73—587 **17 Claims**



1. A method of non-destructively determining, in real time, the acceptability of a weld formed by repetitive pulses of energy, wherein stress wave emission signals emanating from the weld site are monitored, the method comprising the steps of:

counting and storing the number of excursions of the stress wave emission signals above a predetermined threshold during:

(a) a first time period during the application of all the repetitive pulses of energy;

(b) a second time period after the termination of the last of the repetitive pulses; and

(c) a third time period comprised of the sum of all of the time intervals during which the absolute magnitude of each of the repetitive pulses is decaying;

comparing the stored counts with predetermined values to provide an indication of the acceptability of the weld in each of the time periods; and

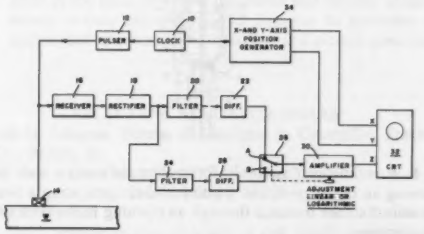
combining the indication of acceptability from all of the comparing means to determine the acceptability of the weld.

4,086,818

ULTRASONIC IMAGING APPARATUS

Charles A. Reynolds, West Haven, Conn., assignor to Smith-Kline Instruments, Incorporated, Sunnyvale, Calif.

Filed Feb. 24, 1977, Ser. No. 771,450
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—620 **2 Claims**



1. An apparatus for improving resolution of an ultrasonic imaging display comprising:

transducer probe means coupled to an object for transmitting an ultrasonic search signal into the object and receiv-

ing echo signals arising from the search signal intercepting an acoustic discontinuity and converting said echo signals to electrical signals;

receiver means coupled to said probe means for receiving said electrical signals and providing echo responsive electrical signals;

first filter and differentiator means coupled to said receiver means for receiving said echo responsive electrical signals and producing a first filtered signal commensurate with the amplitudes of said echo responsive electrical signals and differentiating said first filtered signal for providing first video signals having an amplitude commensurate with the amplitude of each of said echo responsive electrical signals;

second filter and differentiator means coupled to said receiver means for receiving said echo responsive electrical signals and producing a second filtered signal commensurate with said echo responsive electrical signals and differentiating said second filtered signal for providing second video signals having an enhanced leading edge of said echo responsive electrical signals;

switch means coupled to said first filter and differentiator means and to said second filter and differentiator means for receiving said first video signals and said second video signals and selectively providing as an output signal either said first video signals or said second video signals, and

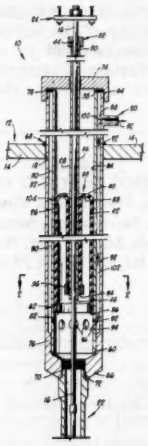
amplifier means coupled to said switch means for receiving and amplifying said output signal and providing said amplified output signal on a display for displaying an image commensurate with said output signal.

4,086,819

ROLLING SEAL FOR A WELL HAVING A ROD-TYPE PUMP

Curtis Mitchell Brownlee, 3033 Rolling Stone Rd., Oklahoma City, Okla. 73120

Filed May 19, 1975, Ser. No. 578,666
Int. Cl.[2] F16J *15/50*
U.S. Cl. 74—18.2 **10 Claims**



1. A rolling seal assembly for sealing between a well head having an outlet port, and a pump rod reciprocating a predetermined stroke distance through an opening in the well head, comprising:

a substantially tubular, flexible seal encircling the rod adjacent to the well head, the seal having a first end, a second end, a pressurized side and a non-pressurized side, and being sized to extend at least one-half the stroke distance;

a first cylinder connected around the rod adjacent to the well head and reciprocating with the rod, the first cylinder having a seal engaging portion defined around an outer circumferential portion thereof;

a seal interposed between the first cylinder and the rod sealingly connecting the first cylinder and the rod;

compression means for compressing the first end of the seal into sealing engagement with the seal engaging portion of the first cylinder; and,

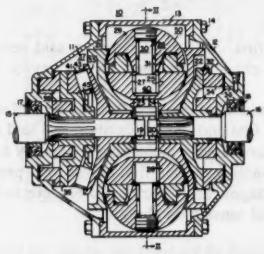
means for sealingly connecting the second end of the seal to the well head around the opening and the rod reciprocating therethrough, the seal rollingly extending between the first and second ends thereof as the first end reciprocates with the rod.

4,086,820

INFINITELY VARIABLE TRACTION ROLLER TRANSMISSION

Charles E. Kraus, and James Hume Kraus, both of Austin, Tex., assignors to Excelermatic, Inc., Austin, Tex.

Filed Jun. 25, 1976, Ser. No. 699,181
Int. Cl.[2] F16H *15/10, 15/12, 15/38*
U.S. Cl. 74—200 **15 Claims**



1. In combination with an infinitely variable traction roller transmission device comprising: coaxial input and output shafts oppositely disposed toric elements, one being supported by each of said shafts for rotation therewith; at least two motion transmitting rollers disposed between said toric elements in radial symmetry with respect to the axis of the input and output shafts; and means for forcing said toric elements toward each other to cause frictional engagement of the motion transmitting rollers with the opposed surfaces of the toric elements; a support structure for each of said rollers, each of said support structures including a pivot shaft having a pivot axis normal to a plane which includes the axis of the input and output shafts, restraining means interconnecting said pivot shafts and limiting independent pivoting of said pivot shafts, and resilient means associated with said restraining means for resiliently forcing said pivot shafts into the proper angular positions relative to each other.

4,086,821

DRIVE ASSEMBLY FOR THE ROTOR OF A SOLVENT EXTRACTOR

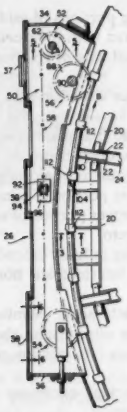
Arthur F. Saxon, Pittsburgh, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Filed Feb. 16, 1977, Ser. No. 768,959
Int. Cl.[2] F16H *7/00, 7/12*
U.S. Cl. 74—221 **6 Claims**

1. An improved drive assembly for a solvent extractor including a rotor formed of a plurality of cells arranged in a circumferential fashion on a generally horizontal plane around a vertical axis of rotation, a chain driven assembly circumferentially mounted about said cells of said rotor, an endless chain in contacting relationship to said driven assembly and a chain driving assembly including a drive sprocket for driving said endless chain, the improvement which comprises;

first sprocket and second sprocket assemblies including a first sprocket and a second sprocket, respectively, said

first sprocket and said second sprocket being mounted about a plane substantially parallel to said chain drive assembly, said first and second sprockets being spaced from one another a distance substantially equal to a contact length between said endless chain and said chain



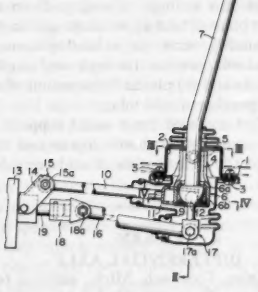
driven assembly between said first and second sprockets, said endless chain segmentally engaging said chain drive assembly, said endless chain being coursed about said first and second sprockets and said drive sprocket, and said drive assembly being positioned within a drive assembly housing mounted to a casing surrounding said rotor.

4,086,822

AUTOMOTIVE TRANSMISSION SHIFTING MECHANISM

Akitada Kuroda, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 21, 1976, Ser. No. 753,019
Claims priority, application Japan, Dec. 28, 1975, 50-158399
Int. Cl.[2] G05G *7/16*
U.S. Cl. 74—473 R **5 Claims**



1. An automotive transmission shifting mechanism comprising

(a) a shift lever with a knob attached to the upper end thereof,

(b) a bracket securely anchored to a floor of an automotive body,

(c) at least one link having its upper end pivoted to said bracket for pivotal movement in the longitudinal direction of the body,

(d) fulcrum means of said shift lever mounted on said link at a position between the upper and lower ends of said link for permitting the pivotal movement of said shift lever in the longitudinal and lateral directions,

(e) a support rod having its one end pivoted to the lower end of said link and the other end pivoted to a transmission housing, and

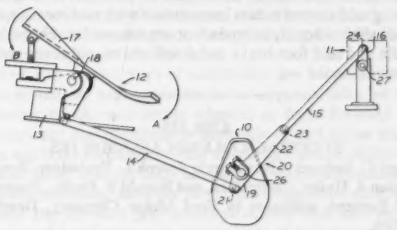
(f) a control rod extended downwardly of and substantially in parallel with said support rod and having its one end pivoted to the lower end of said shift lever and the other end pivoted to a control shaft of said transmission, whereby the movement of said shift lever may be transmitted to said control shaft.

4,086,823

TRANSMISSION AND THROTTLE CONTROL ARRANGEMENT

Richard N. Fatur, Eastlake, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Jun. 24, 1977, Ser. No. 809,726
Int. Cl.[2] G05G *1/14*
U.S. Cl. 74—474 **6 Claims**



1. A transmission and throttle control arrangement comprising

transmission control means having a rotary input shaft,

a bellcrank secured to said input shaft and having first and second arms

throttle control means,

actuating means movably mounted on a support for movement between first and second positions,

a first link means interconnected between said actuating means and the first arm of said bellcrank and reciprocal in a first direction upon movement of said actuating means to its first position and reciprocal in a second direction opposite to said first direction upon movement of said actuating means to its second position, and

a second link means interconnected between the second arm of said bellcrank and said throttle control means for movement in the same direction to actuate said throttle control means in only one direction in response to actuation of said actuating means to both its first and second positions.

4,086,824

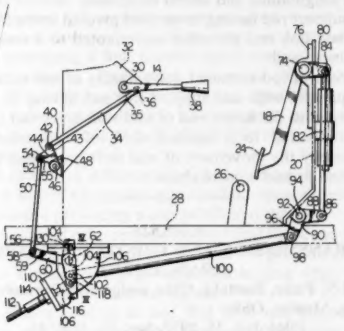
SPLIT LINK ACTUATOR BRAKE

David G. Johnson, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 16, 1977, Ser. No. 778,204
Int. Cl.[2] G05G *11/00*
U.S. Cl. 74—481 **11 Claims**

8. In a vehicle having a brake, a rod axially movable to actuate said brake, a housing for supporting said rod and means for axially moving said rod for setting and releasing said brake, in combination, said means comprising a shaft rotatably mounted in said housing, a lever splined to said shaft and operatively connected to said rod, means splined to said shaft for rotation therewith, a first means rotatably mounted on said

shaft and having a portion selectively in contact with said means splined to said shaft, a hand-brake handle operatively connected to said first means for moving said first means into contact with said means splined to said shaft, second means rotatably mounted on said shaft and having a portion selectively in contact with said means splined to said shaft, a foot-brake pedal operatively connected to said second means for moving said second means into contact with said means splined to said shaft whereby independent actuation of said hand-brake handle and said foot-brake pedal will move said lever and rod to set said brake.

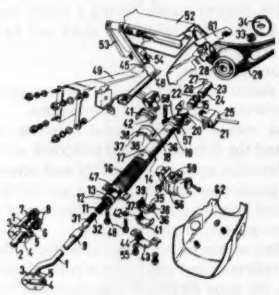


4,086,825

STEERING COLUMN ASSEMBLIES

Sidney C. Badcock, Hornchurch; Joseph L. Dreissiger, Benfleet; Brian J. Holby, Chelmsford, and Ronald P. Pardy, Tiptree, all of England, assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 18, 1976, Ser. No. 743,030
Int. Cl.[2] B62D *1/18*; F16D *1/10*
U.S. Cl. 74—492 **1 Claim**



1. A steering column assembly for a motor vehicle comprising a steering shaft having an upper shaft section connected to a steering wheel and a lower shaft section constructed to be connected to a steering gear;

said upper and lower shaft sections being rigid and non-collapsible under large impact loads;

the lower end of said upper shaft section having a crank portion spaced apart from the axis of rotation of said upper shaft section;

a first plate secured to the end of said crank portion arranged perpendicular to the axis of rotation of said upper shaft;

said first plate having an elongated slot therethrough;

a pair of pins secured to said first plate extending in a direction toward the upper end of said upper shaft section;

said pins being situated on diametrically opposite sides of said axis of rotation of said upper shaft section;

the upper end of said lower shaft section extending through said slot in said first plate of said upper shaft section;

said upper end of said lower shaft section being coaxial with the axis of rotation of said upper shaft section;

a second plate having portions extending radially in opposite directions secured to the upper end of said lower shaft section;

said radially extending portions of said second plate having a pair of holes situated with their centers on diametrically opposite sides of said axis of rotation of said upper shaft portion;

a pair of rubber bushes seated in said holes of said second plate;

said pins secured to said first plate being slidably received in said bushes of said second plate;

a collapsible tube surrounding said upper shaft section;

said tube having a lower portion of convoluted construction;

the lower end of said lower portion of said tube having a first bracket affixed thereto;

said first bracket having radially extending bracket portions;

said tube having an intermediate portion with a smooth exterior surface;

a pair of arcuate elastomeric members surrounding said intermediate portion of said tube above the upper end of said convoluted lower tube portion and in slidable engagement therewith;

a pair of arcuate brackets enclosing said pair of arcuate elastomeric members;

an elongated rigid sheet metal support secured at its forward end to a firewall of a motor vehicle;

a brake control pedal pivotally connected to said rigid sheet metal support;

said sheet metal support having spaced portions bolted to said first bracket and to said arcuate brackets;

a second sheet metal support secured to an instrument panel of said vehicle and bolted to said arcuate brackets;

said tube having an upper portion with a smooth exterior surface spaced upwardly of said intermediate tube portion;

said upper tube portion having a lesser outside diameter than said intermediate portion;

said upper tube portion supporting first steering shaft lock means and enclosing second steering shaft lock means secured to said steering shaft;

said second lock means being engageable by said first lock means;

said steering column assembly being constructed to absorb a forwardly directed impact load on said steering wheel by (a) forward axial displacement of said upper steering shaft section relative to said lower steering shaft section whereby said pins slidingly disengage from said bushes and said first plate of said upper shaft section slides along said lower shaft section, (b) axial displacement of said intermediate tube portion through said arcuate elastomeric members and (c) plastic deformation of said convoluted lower portion of said tube;

said first bracket and said sheet metal support being constructed to rigidly support said lower end of said tube during the plastic deformation of said convoluted lower tube portion.

4,086,826

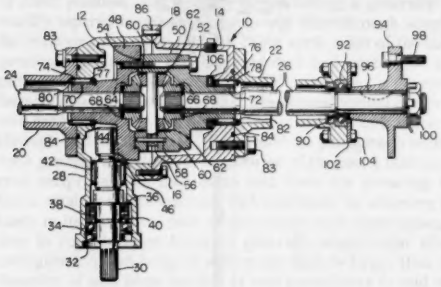
DIFFERENTIAL AXLE

Roland L. von Kaler, Tecumseh, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Dec. 6, 1976, Ser. No. 747,914
Int. Cl.[2] F16H *1/40*
U.S. Cl. 74—713 **4 Claims**

1. In a differential axle; a central die cast aluminum housing, a differential carrier unit rotatable on a predetermined axis in the housing, said differential unit comprising an input member and a pair of output members, said input member having wear resistant hub portions forming an inner bearing race and dis-

posed on opposite sides thereof on said axis, said central housing having cylindrical bores on said axis within the axial range of said hubs, needle bearings disposed in said bores journalling said hubs therein, tubular portions connected to opposed sides of the central housing on said axis for supporting said output members at one end, said needle bearings including outer races



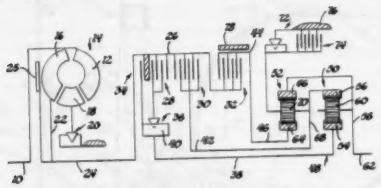
which engage the peripheral walls of the bores and within which races the needles roll in direct contact with the wear resistant hub portions when said differential unit rotates, said needle bearing outer races projecting outwardly from said central housing into said tubular portions, said tubular portions having recesses for receiving said races with the races forming pilots to locate the tubular portions on the central housing.

4,086,827

FOUR-SPEED TRANSMISSION

Howard E. Chana, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 21, 1975, Ser. No. 606,501
Int. Cl.[2] F16H *57/10*
U.S. Cl. 74—759 **3 Claims**



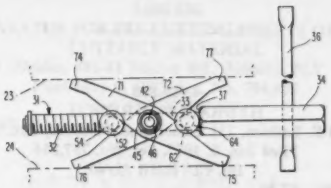
1. In a transmission having input means; output means; and a planetary gear arrangement to establish at least four forward speed ratios and at least one reverse speed ratio including a plurality of gear members, a plurality of brake means a plurality of selectively engageable friction clutch means interconnected with said input means and said planetary gear arrangement, one of said friction clutch means being engaged during all of the forward speed ratios and disengaged during the reverse speed ratio, said other friction clutch means and said brake means are selectively engaged to establish said speed ratios and are selectively interchanged to effect a change from one forward speed ratio to another; the improvement comprising; a one-way clutch serially disposed in drive relation between said one of said clutch means and one of said gear members of said planetary gear arrangement such that said one gear member is driven at a speed not less than the speed of the input means during all forward speed ratios whereby said one-way clutch is operable to provide a controlled drive path from said input means to said planetary gear arrangement during speed ratio changes from third ratio to fourth ratio, or fourth ratio to third ratio, or fourth ratio to second ratio without simultaneous overlapping operation of any of other friction clutch means or brake means to effect the above-desired ratio changes.

4,086,828

DISC BRAKE PAD SPREADER

William G. Mader, York, Pa., assignor to K-D Manufacturing Company, Lancaster, Pa.

Filed Jul. 18, 1977, Ser. No. 816,295
Int. Cl.[2] B23P *19/04*
U.S. Cl. 81—3 K **12 Claims**



1. A hand tool for spreading, or maintaining at spaced separation, caliper-mounted disc-brake pads for facilitating mounting on a disc-brake rotor, said tool comprising:

a. an elongated screw having a threaded shank at the forward end and a thrust bearing surface toward the rearward end;

b. a pivot-stud body having a hole therethrough through which said screw shank passes, said pivot-stud body having first and second pivot studs extending laterally therefrom in opposite directions;

c. first and second pairs of scissor-like jaw levers pivotally mounted on said pivot studs on opposite sides of said screw shank, said levers adapted to form forward and rearward jaw openings on each side of said screw shank;

d. a nut body threaded on said shank forward of said pivot-stud body, said nut body having first and second camming studs extending laterally therefrom in opposite directions into the forward jaw openings of said first and second pairs of jaw levers on opposite sides of said screw shank; and

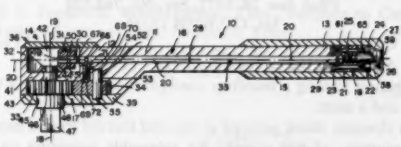
e. a shoulder-stud body having a hole therethrough through which said screw shank passes, said shoulder-stud body being rearward of said pivot-stud body but forward of said thrust bearing surface, said shoulder-stud body having first and second camming studs extending laterally in opposite directions therefrom into the rearward jaw openings of said first and second pairs of jaw levers on opposite sides of said screw shank.

4,086,829

SPEED HANDLE RATCHET

James L. Hudgins, Box 807, Cedar Crest, N. Mex. 87008

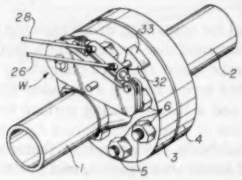
Filed Feb. 17, 1977, Ser. No. 769,415
Int. Cl.[2] B25B *23/14*
U.S. Cl. 81—52.4 R **12 Claims**



1. A speed handle ratchet comprising an elongated handle having first and second ends, a head on one end of said handle mounted for rotation about a first axis transverse to said handle, a hand grip on the other end of said handle mounted for rotation about a second axis parallel to said handle, drive means connecting said hand grip to said head for rotation of said head in response to rotation of said hand grip, ratchet means at the one end of said handle operatively joining said handle to said head for rotation of said head in response to oscillation of said handle, and coupling means at the other end

of said handle operatively joining said hand grip to said drive means, said coupling means transmitting rotation of said hand grip through said drive means into rotation of said head below a selected torque load level, and said coupling means preventing rotation of said hand grip by said drive means during rotation of said head in response to oscillation of said handle above the selected torque load level.

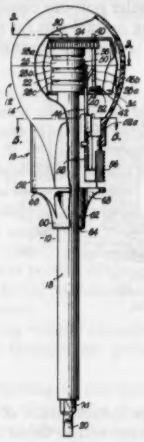
4,086,830
HYDRAULIC WRENCH
Raymond E. Latham, 231 Tamerlaine, Houston, Tex. 77024
Filed Jan. 6, 1977, Ser. No. 757,344
Int. Cl.[2] B25B *13/46*
U.S. Cl. 81—57.39 **5 Claims**



1. A hydraulic wrench comprising: elongated body means having a hole therethrough the axis of which is substantially perpendicular to the axis of said body means; drive means rotatably mounted at one end of said body means; socket means connected to said drive means for rotation therewith; reciprocal hydraulic power means connected to said drive means and to the other end of said body means for rotating said drive means in one direction on movement in a first direction; latch means carried by said body means to prevent rotation of said socket means upon movement of said power means in a second direction; and an elongated rod member slidably receivable within said body means hole with its axis substantially perpendicular to the axis of said body means and extendable from either side of said body means at a plurality of locations for engagement with any suitable fixed object to provide reaction force for operation of said wrench.

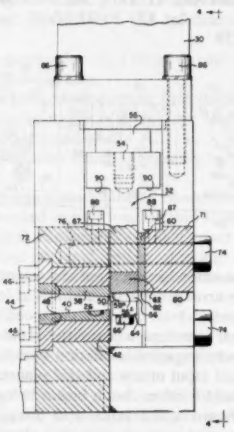
4,086,831
RATCHET DRIVER
Lloyd T. Smith, Newton, Kans., assignor to S/V Tool Company, Inc., Newton, Kans.
Filed Jan. 28, 1977, Ser. No. 763,529
Int. Cl.[2] B25B *13/46*
U.S. Cl. 81—62 **7 Claims**

1. A screwdriver including:
a handle having a teardrop configuration presenting a bulb and a stem;
an elongate shank secured at one end thereof to said handle;
a plurality of bits adapted for releasable mounting on the other end of said shank; and
a series of projections on said stem for facilitating the application of torque to handle during use,
said projections being hollow, presenting individual storage chambers for said bits,
said chambers each having an open and a closed end,
said open ends facing toward said other end of the shank, there being an indexable retainer rotatably mounted on said handle remote from said bulb and in normally closed relationship to said open ends,
said retainer having an opening formed therein for providing access into any selected one of said chambers when the



retainer is rotated to a position wherein said opening is aligned with the open end of the selected chamber.

4,086,832
APPARATUS FOR SHEARING A WORKPIECE SUCH AS A METAL BAR OR THE LIKE
Myron I. Korytko, Erie, Pa., assignor to Efco, Inc., Erie, Pa.
Filed Feb. 27, 1976, Ser. No. 662,267
Int. Cl.[2] B26D *1/06*; B23D *15/04*
U.S. Cl. 83—198 **4 Claims**



1. An apparatus for shearing a workpiece such as a metal bar and the like comprising, means for applying to the bar to be sheared a generally radial substantially circumferentially applied compressive load of an extent at least equal to the force necessary to cause plastic flow of the bar material, means downstream from and adjacent the first mentioned means for shearing off the metal bar generally immediately adjacent the compressive load applying means and operative along a plane substantially perpendicular to the lengthwise axis of the bar, said shearing means comprising a reciprocal blade having a passageway therethrough, said passageway defining the shearing surface of said blade and comprising a generally linear section disposed adjacent said first mentioned means and a

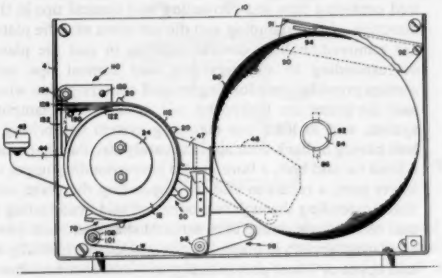
section diverging rearwardly from said linear section whereby the application of shearing force to the bar will be concentrated adjacent the compressive load applying means of said apparatus, and wherein the bar to be sheared is generally circular in cross section, said compressive load applying means comprising, a holding die, means for retaining the holding die in fixed position, said holding die including a generally inwardly tapered lengthwise passageway therethrough adapted for receiving the metal bar and cause application of the compressive load to the bar, the rearward end portion of said passageway through said holding die comprising a generally linearly extending section so that the circumferential compressive load applied by the holding die to the bar as it is forced through said die will be applied by said die passageway section for a predetermined extent lengthwise of the bar, a fluid powered reciprocal ram secured to said blade for actuating the latter, retainer means coacting with said blade for retaining the blade in its reciprocal path of movement, said blade passageway in end elevation being of generally semicircular shape configuration, and being of a diameter slightly larger than the diameter of said linear section of said passageway in said die, said retainer means including a wear means adapted for engagement with the rearward side of said blade for guiding the reciprocal movement thereof, said retainer means having a passageway therethrough generally in line with the first mentioned passageways and through which can extend the bar to be sheared for providing for shearing off the end of the bar at any selected point lengthwise thereof.

4,086,833

TICKET ISSUING MACHINE

Harvey B. Austin, Jr., Berwyn, Pa., assignor to Globe Ticket Company, Horsham, Pa.

Filed Apr. 6, 1977, Ser. No. 785,023
Int. Cl.[2] B26D *5/24*
U.S. Cl. 83—205 **18 Claims**



1. A ticket issuing machine comprising:

a supply of tickets having feed holes spaced along a web,

a ticket wheel rotatably mounted adjacent said supply of tickets and having pins projecting from the periphery thereof,

said pins being spaced circumferentially around the periphery of the ticket wheel for engaging the ticket web at said feed holes,

means guiding the ticket web from said supply of tickets onto the periphery of the ticket wheel for engagement with said pins at said feed holes,

means for guiding said ticket web from the periphery of said ticket wheel for issuance from the machine, and

means for rotatably advancing said ticket wheel through a stroke to issue one ticket from the machine including

manually operable means engageable with said ticket wheel for causing rotation thereof through the first part of said ticket issuing stroke,

and spring operated means for causing rotation of said ticket wheel through the remainder of said ticket issuing stroke,

said ticket wheel having a polygonal shaped inner rim providing a plurality of circumferentially equally spaced apexes,

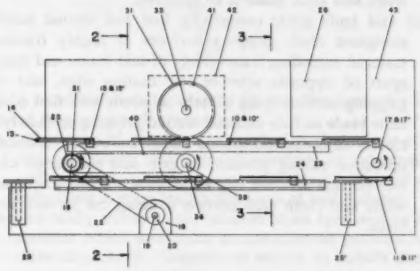
said spring operated means including a detent mechanism having spring means and bearing means urged by said spring means into the apexes of said inner rim.

4,086,834

APPARATUS FOR DIE CUTTING SHEETS OF DIE CUTTABLE MATERIAL

Walter A. Shields, 181-41 Henley Rd., Jamaica, N.Y. 11432

Filed May 9, 1977, Ser. No. 794,897
Int. Cl.[2] B26F *1/00*
U.S. Cl. 83—326 **5 Claims**



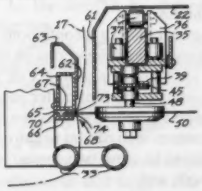
1. Apparatus for die cutting sheets of die cuttable material, comprising endless conveyor means, means for guiding the conveyor means in a path having upper and lower horizontal portions, a plurality of platens sequentially mounted on said converyor means, means for continuously supporting the platens in a horizontal orientation, a respective cutting die mounted on each of said platens, a storage means oriented for retaining a plurality of sheets of die cuttable material in a vertical stack with each of the sheets oriented horizontally, means for removing a respective one of said sheets from the bottom of said stack and positioning said sheet on the cutting die of a respective one of said platens as the platens are continuously non-reversingly conveyed by said conveyor means, a pair of rollers defining a nip therebetween and means for driving the rollers at the same rotational speed and in opposite rotational senses, the nip being so positioned relative to the conveyor means that the conveyor means consecutively convey the respective platens through the nip and the nip being so dimensioned that the sheet is pressed onto the cutting die sufficiently to cause the die to cut through the sheet as the platen carrying the sheet passes through the nip.

4,086,835

RESILIENT KNIFE GUIDE FOR CLOTH SPREADING MACHINE

Cecil S. Frederick, Murfreesboro, Tenn., assignor to Cutters Machine Company, Inc., Nashville, Tenn.

Filed Jan. 31, 1977, Ser. No. 763,839
Int. Cl.[2] B65H *29/46*
U.S. Cl. 83—484 **6 Claims**



1. In a cloth spreading machine including a frame having a transverse dimension and adapted to travel in a longitudinal

path along a table, and spreading means on the frame for spreading a web of cloth longitudinally upon the table, a cutting apparatus comprising:

(a) a knife blade having a cutting edge and first and second planar surfaces on opposite sides of said cutting edge,

(b) means mounting said knife blade on said frame for operative cutting movement along a cutting path transversely of said frame,

(c) an elongated knife guide mounted transversely on said frame for cooperation with said knife blade in said cutting path,

(d) means on said frame suspending a portion of the cloth web to normally freely hang adjacent said cutting path when said knife blade is inoperative,

(e) said knife guide comprising first and second parallel elongated cloth gripping surfaces of highly frictional material extending transversely of said frame and spaced apart on opposite sides of said cutting edge, said first gripping surface lying closely adjacent said first planar knife blade surface and said second gripping surface lying closely adjacent said second planar knife blade surface in operative cutting position to grip said suspended cloth web portion between said knife blade and said knife guide while said cloth web portion is being cut by said knife blade.

4,086,836

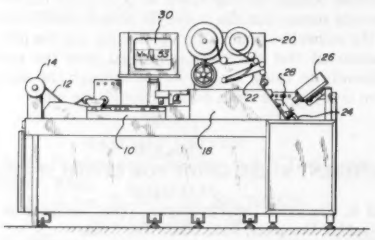
MULTIPLE FRAME PROJECTOR FOR TV VIEWING SYSTEM

Gerald A. Jensen, Wayzata, and Robert E. Diesch, Rogers, both of Minn., assignors to Pako Corporation, Minneapolis, Minn.

Filed Feb. 10, 1977, Ser. No. 767,335

Int. Cl.[2] B26D *7/00, 11/00*

U.S. Cl. 83—521 **9 Claims**



1. A photographic packaging system comprising:

print cutter means for cutting individual photographic prints from a continuous web;

film cutter means for cutting a continuous web of film negatives into segments containing one or more frames;

camera means for viewing a plurality of frames of the film negatives proximate the film cutter means;

view splitter means positioned between the camera means and the continuous web of film negatives for allowing the television camera to view two spaced apart frames of the continuous web; and

display means for displaying the frames viewed by the camera means to permit an operator to compare the frames with prints at the print cutter means.

4,086,837

STAMPING AND CUTTING DIE-SET WITH INTERCHANGEABLE DIE-PLATES

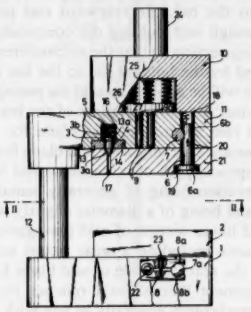
Manfred Dyck, Calenberger Strasse 31, 3204 Nordstemmen, Germany

Filed Sep. 30, 1976, Ser. No. 728,157

Claims priority, application Germany, Oct. 3, 1975, 2544239

Int. Cl.[2] B26D *7/26;* **B26F** *1/44*

U.S. Cl. 83—698 **7 Claims**



1. In a stamping and cutting die set having exchangeable die plates located in a plane and comprising an upper part, a lower part and guide means connecting said upper part and said lower part and securing at least one cutting die and at least one clamping system for said at least one cutting die, the improvement comprising:

a plurality of centering pins, each having a conical tip and located in said upper part and said lower part, boreholes located in said upper part and said lower part wherein said centering pins are displaceable, said boreholes extending normally to said plane of the die plates, springs loading said centering pins and projecting said conical tips in the direction of said stamping and die set when said die plates are removed, hollow conical recesses in said die plates corresponding to and receiving said conical tips, said springs providing pre-loading on said centering pins when said die plates are locked by said at least one clamping system, said at least one clamping system comprising a bolt having a shank with approximately circular shape and a head on said bolt, a bore in said corresponding upper or lower part, a recess in said corresponding die plate, said shank extending through said bore and said head resting in said recess, a clearance between said shank and said bore, a rotating eccentric clamping pin guided horizontally in said upper or lower part entering said clearance and drawing said bolt toward said upper or lower part.

4,086,838

VIBRATO SIGNAL GENERATING ARRANGEMENT FOR AN ELECTRONIC MUSICAL INSTRUMENT

Katsuzi Kawamura, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Oct. 19, 1977, Ser. No. 843,406

Claims priority, application Japan, Nov. 19, 1976, 51-154512[U]

Int. Cl.[2] G10H *1/04*

U.S. Cl. 84—1.25 **7 Claims**

1. A vibrato signal generating arrangement for an electronic musical instrument comprising:

potential sources of first, second and third potentials, said third potential having an intermediate value between said first and second potentials;

a capacitor having a first terminal connected to said source of the second potential;

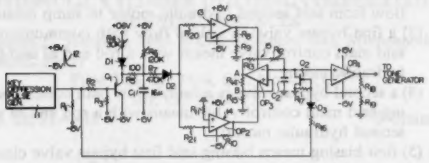
a switching device connected in parallel with said capacitor;

a series combination of a first resistor and a first unidirec-

tional device connected between said source of the third potential and a second terminal of said capacitor;

a second resistor connected between said source of the first potential and said second terminal of said capacitor;

a second unidirectional device having an input connected to the junction between said second resistor and said capacitor;



means coupled to said switching device for producing a key depression representative signal at the instant of key depression to render said switching device conductive to discharge said capacitor; and

a vibrato oscillator means connected to an output of said second unidirectional device.

4,086,839

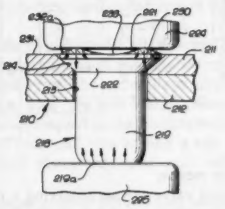
DOME HEADED RIVET, AND WORKPIECE ASSEMBLY

Franklin S. Briles, 1301 Dolphin, Corona Del Mar, Calif. 92625

Continuation-in-part of Ser. No. 732,869, Oct. 15, 1976, Pat. No. 4,051,592, which is a continuation-in-part of Ser. No. 645,242, Dec. 29, 1975, Pat. No. 4,000,680, which is a continuation-in-part of Ser. No. 621,826, Oct. 14, 1975, abandoned. This application Apr. 4, 1977, Ser. No. 783,976

Int. Cl.[2] F16B *19/04*

U.S. Cl. 85—37 **9 Claims**



1. In combination with a workpiece having a bore and a counterbore which is frusto-conical and tapers forwardly between a side of the workpiece and the bore, and toward the bore,

(a) a rivet having an axially extending shank received in the workpiece and defining an axis,

(b) the rivet including a head having an end face and a forwardly tapered frusto-conical section located forwardly of said end face,

(c) the periphery of said head end face being substantially flush with the work surface, the end face forming a dome protruding axially in a rearward direction, said dome being generally ring-shaped and extending about said axis in substantially axial alignment with the outer surface of the shank,

(d) the dome having an annular crest portion in axial alignment with said shank outer surface, and the dome radially outer extent which defines only about half of the dome being located in axially spaced relation to a forward taper defined by said forwardly tapered frusto-conical section, said dome crest portion being rearwardly convex in axial radial planes,

(e) the head end face forming a concave central recess radially inwardly of said crest portion, the outermost annular extent of said recess located approximately in alignment with the outer surface of the shank.

4,086,840

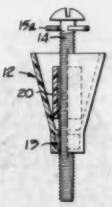
HOLLOW WALL FASTENER

Robert A. Kurlander, 9175 SW. 77th Ave., Suite 304, Miami, Fla. 33156

Filed Jan. 24, 1977, Ser. No. 762,002

Int. Cl.[2] F16B *13/06*

U.S. Cl. 85—80 **22 Claims**



1. A blind wall fastener adapted for insertion through a hole formed through a wall comprising

a hollow conical member composed of an elastomeric material and having thin sidewall portions of substantially uniform thickness throughout axial lengths thereof and collapsible along a longitudinal axis of said member,

an internally threaded nut secured to an apex end of said member which terminates at said sidewall portions, said sidewall portions collapsible to assume an outside diameter no larger than the outside diameter of the apex end of said member, and

a threaded member threadably mounted in said nut whereby upon insertion of said blind wall fastener through the hole formed through said wall, the sidewall portions of said member will expand radially outwardly automatically to engage a backside of said wall.

4,086,841

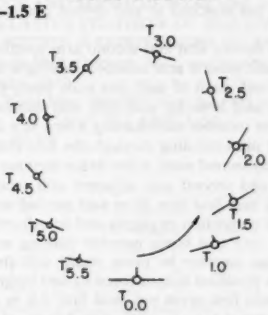
HELICAL PATH MUNITIONS DELIVERY

Gilmour C. MacDonald, 55 Warwick Dr., Rte. 1, Shalimar, Fla. 32579

Continuation-in-part of Ser. No. 177,769, Sep. 3, 1971, abandoned. This application Jan. 22, 1974, Ser. No. 436,364

Int. Cl.[2] F41G *3/24*

U.S. Cl. 89—1.5 E **8 Claims**



1. A method for the air-to-ground delivery of a munition upon a selected target from a flight-controlled aircraft so as to mitigate damage to the aircraft by defensive action of an enemy which comprises:

A. automatically causing the aircraft to fly a helical path in passage toward the selected target under the control of a target position determining device, said helical path comprising at least one complete roll of the aircraft through approximately 360° of bank angle along a substantially horizontal helix axis,

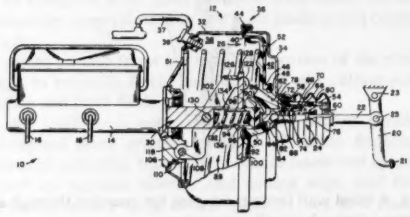
B. automatically continuously determining the position of said aircraft relative to said target, and

C. automatically discharging a munition from said aircraft flying said helical path and while the velocity vector of the aircraft lies in a vertical plane approximately through said target.

4,086,842
INTERNAL FORCE MULTIPLIER FOR A SERVOMOTOR

Oswald Oscar Kytta, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Oct. 28, 1976, Ser. No. 736,665
Int. Cl.[2] F15B *9/10, 13/10*
U.S. Cl. 91—369 A **2 Claims**



1. A servomotor comprising:

a housing having a cavity therein;

wall means for dividing said cavity into a first chamber and a second chamber, said first and second chambers being connected to a source of vacuum;

valve means in said wall means for interrupting the communication of vacuum to said second chamber and allowing an operational fluid to be communicated to said second chamber to produce a pressure differential across said wall means;

an input push rod member responsive to an operator force for moving said valve means to develop said pressure differential, said pressure differential causing said wall means to move and develop an output force;

a cylindrical member connected to wall means and engaging said valve means;

a radial projection member attached to said cylindrical member;

an output push rod member extending from said housing for supplying a mechanism with an operational force, said push rod having a bore therein, said cylindrical member extending into said bore;

a first pivot pin attached to said output push rod member; and

lever means having first and second arm members, each of said first and second arm members having a first end and a second end, each of said first ends being pivotally attached to said housing, said first arm member and said second arm member each having a first slot therein, said first pivot pin extending through the first slot in each of the first and second arms, a first brace member attached to said first and second arm adjacent said second end for separating said first arm from said second arm member, said radial projection engaging and transferring said output force into said brace member causing said first and second arm member to pivot about said first end and transmit a modified output force to said output push rod through said first pivot pin, said first slot in each of the first and second arms permitting said first and second arm members to rotate about said first ends while allowing said output push rod member to move linearly.

4,086,843
TILT TIP CIRCUIT WITH BYPASS VALVE

Larry W. Lorimor, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 17, 1977, Ser. No. 769,626
Int. Cl.[2] F15B *11/00*
U.S. Cl. 91—413 **6 Claims**

1. In a fluid flow control system for an earth moving blade pivotally supported on a vehicle for selectively varying the tip and tilt of said blade relative to a ground surface through selectable extension and contraction of a first and a second hydraulic motor which communicate between said vehicle and said blade, an improvement comprising:

(1) main pump means;

(2) main control valve means receiving a main inflow from said main pump means and being in flow communication via a first flow path with a head end of said first hydraulic motor and in flow communication via a second flow path with said second hydraulic motor and delivering an outflow from said second hydraulic motor to sump means;

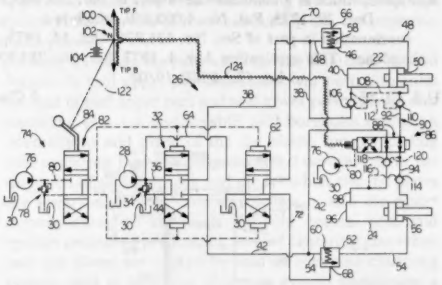
(3) a first bypass valve in a third flow path communicating said main control valve means with a rod end of said first hydraulic motor;

(4) a second bypass valve in a fourth flow path communicating said main control valve means with a rod end of said second hydraulic motor;

(5) first biasing means biasing said first bypass valve closed;

(6) second biasing means biasing said second bypass valve closed;

(7) bypass control valve means receiving said main inflow and delivering said main inflow selectively to a bias opposing portion of a respective one of said first and second bypass valves to cause said respective one of said first and second bypass valves to open responsive to pressure in a respective one of said first and second flow paths producing a force exceeding a force due to a respective one of said first and second biasing means while connecting with a bias opposing portion of a respective other of said first and second bypass valves and communicating said respective other bias opposing portion to said sump means;



(8) pilot pump means;

(9) pilot control valve means receiving a pilot inflow from said pilot pump means and selectively delivering said pilot inflow to substantially simultaneously shift said main control valve means and said bypass control valve means into a first pilot mode in which said bypass control valve means delivers said main inflow to said bias opposing portion of said first bypass valve while said main control valve means delivers said main inflow to said head end of said first hydraulic motor, and into a second pilot mode in which said bypass control valve means delivers said main inflow to said bias opposing portion of said second bypass valve while said main control valve means delivers said main inflow to said second hydraulic motor;

(10) operator shiftable control means for selectively shifting said pilot control valve means to said first and second pilot modes;

(11) motor control valve means in a hydraulic motor flow path communicating said rod end of said first hydraulic motor with said second hydraulic motor, said motor control valve means fluid flow connecting in a first motor mode said rod end of said first hydraulic motor with said rod end of said second hydraulic motor while simultaneously fluid flow connecting a head end of said second hydraulic motor to said sump means and in a second motor mode fluid flow connecting said rod end of said first hydraulic motor to said head end of said second hydraulic motor while simultaneously fluid flow connect-

ing said rod end of said second hydraulic motor to said sump means; and

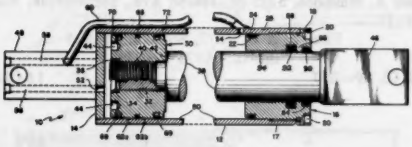
(12) operator shiftable motor control means for selectively shifting said motor control valve means to said first and second motor modes.

4,086,844

HYDRAULIC CYLINDER UTILIZING CORRUGATED RUNNING SURFACES

Kenneth C. Homuth, 1885 E Old Shakopee Rd., Minneapolis, Minn. 55437

Filed Feb. 18, 1976, Ser. No. 659,127
Int. Cl.[2] F16J *15/18*
U.S. Cl. 91—418 **3 Claims**



1. In combination,

a. a cylinder having a closed first end, and a second end defining a cylinderhead having a passage therethrough;

b. a piston reciprocable within said cylinder;

c. a piston rod connected to said piston and sealably projecting through said cylinderhead passage;

d. means for selectively admitting pressurized hydraulic fluid into said cylinder to cause reciprocation of said piston;

e. a plurality of parallel ribs and valleys arranged around the circumference of said piston, said ribs and valleys being aligned at an acute angle with respect to the directions of reciprocation of said piston, said ribs having a top flat surface for contacting said cylinder and said valleys being V-shaped;

f. a journal in said cylinderhead, said journal having an inner surface for contacting said piston rod, said inner surface having a plurality of ribs and valleys arranged around its circumference, said ribs and valleys being aligned at an acute angle with respect to the directions or reciprocation of said piston rod, said ribs having a top flat surface for contacting said piston rod and said valleys being V-shaped;

g. a circumferential groove around said piston and intersecting said parallel ribs and valleys; and

h. a resilient O-ring sealing member in said circumferential groove.

4,086,845

VARIABLE DELIVERY HYDRAULIC EQUIPMENT

Kinzo Takagi, 4-15, 5-chome, Kurihara, Niiza-shi, Saitama-ken, Japan

Filed Mar. 9, 1976, Ser. No. 665,194
Claims priority, application Japan, Mar. 14, 1975, 50-30917
Int. Cl.[2] F01B *3/04, 13/04;* **F04B** *49/08*
U.S. Cl. 91—483 **5 Claims**

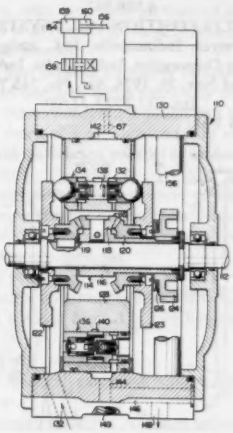
1. A variable delivery hydraulic equipment, comprising:

a rotary shaft rotatably supported on a housing;

a cylinder block having a plurality of axial cylinder bores provided on the periphery thereof and disposed coaxially with the rotary shaft;

a plurality of plunger assemblies each having a pair of plungers oppositely disposed within the respective cylinder bore so as to define a chamber therebetween and slideably movable within the respective cylinder bore, oil retainer means, a pair of cam followers revolvingly mounted on the outer end of each plunger and oil retainer means, the cam followers being floatingly supported by an operational fluid flowing into the oil retainer means through a communicating passage, each of the oil retainer means having a first oil space defined between the cam followers and the outer end of the plunger, the diameter of the outer end support portion of the plunger on which the cam follower is supported being more than 1.2 times the diameter of the slidable section of the plunger; and

a pair of cams between which the cylinder block is disposed,



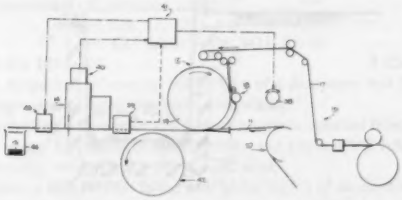
the cams being adapted to contact with the cam followers of the plunger assembly :o impart a plurality of reciprocatory movements in one cycle to the opposite plungers, each having a cam surface substantially perpendicular to the rotary shaft, and being so designed as to impart different and ever-changing moving speeds to the opposite plungers respectively, in all phase positions except when the moving speeds of both plungers are zero.

4,086,846

APPARATUS AND METHOD TO SENSE AND ADJUST THE RELATIVE POSITION OF HOLLOW TUBES WITHIN A CONTINUOUS FILTER

Floyd Vanmeda Hall, Durham, N.C., assignor to Liggett Group Inc., Durham, N.C.

Filed Mar. 29, 1977, Ser. No. 782,398
Int. Cl.[2] A24C *5/50*
U.S. Cl. 93—77 FT **10 Claims**



9. In a process for making cigarette filter rods containing spaced apart hollow tubes, wherein each rod is cut from a stream of fibrous filter material, a method for sensing and adjusting the position of a hollow tube in the stream of fibrous filter material comprising the steps of

sensing the position of a hollow tube within the stream of fibrous filter material and generating a position signal in response thereto;

generating a reference signal indicative of the cutting of a rod from the stream;

comparing the position signal and the reference signal and generating a correction signal in response to a disparity therebetween; and

correcting the position of a hollow tube being subsequently inserted in the stream of fibrous filter material in response to said correction signal.

4,086,847

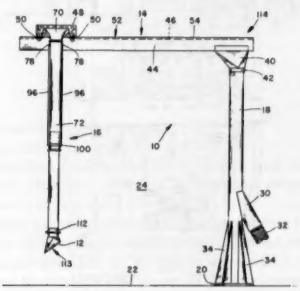
MULTI-POSITION DUCT SYSTEM

Robert C. Overmyer, Indianapolis, Ind., assignor to Hawley Manufacturing Corporation, Indianapolis, Ind.

Filed Nov. 29, 1976, Ser. No. 745,795

Int. Cl.[2] F23J *11/00*

U.S. Cl. 98—115 VM **14 Claims**



1. An exhaust apparatus comprising a conduit including an elongated duct having proximal and distal ends and a longitudinal wall closed by a flexible web, the conduit further including a car mounted on the duct for movement longitudinally thereof, the car cooperating with the web to define within the car a chamber communicating with the interior of the duct, means for coupling the duct to a source of suction, and means for supporting the duct adjacent its proximal end for pivotal movement in a generally horizontal plane.

4,086,848

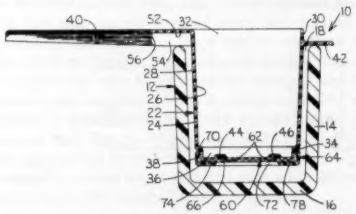
DEVICE FOR BREWING INDIVIDUAL CUPS OF COFFEE

Harry L. Hahn, 21207 S. Avalon Blvd., Carson, Calif. 90745

Filed Jan. 26, 1977, Ser. No. 762,633

Int. Cl.[2] A47G *19/14;* **A47J** *31/00*

U.S. Cl. 99—323 **4 Claims**



1. A device for brewing coffee in a cup having an encompassing sidewall, a closed bottom and an open top, said device comprising;

(A) a receptacle including an encompassing sidewall having an inner surface, an open bottom and an open top, said receptacle sidewall being of smaller diameter than said cup sidewall, whereby said receptacle will fit inside said cup, said receptacle having an outwardly-projecting annular collar encompassing said receptacle open bottom;

(B) a filter closing said receptacle open bottom; and

(C) a filter retainer releaseably coupled to said receptacle for securing said filter to said receptacle open bottom, said filter retainer including:

(a) an encompassing sidewall having an inner surface, an open bottom and an open top;

(b) an inwardly-directed annular collar encompassing said filter-retainer inner surface at said filter-retainer open top for engagement with said outwardly-projecting annular collar, whereby said releaseable coupling is effected;

(c) a circular-shaped member; and

(d) a plurality of struts affixing said circular-shaped member in said filter-retainer open bottom for supporting said filter.

4,086,849

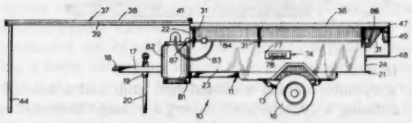
MOBILE BROILER APPARATUS

James A. Simmons, 5225 St. Joseph Ave., Stevensville, Mich. 49127

Filed Apr. 14, 1977, Ser. No. 787,624

Int. Cl.[2] A47J *37/07*

U.S. Cl. 99—357 **11 Claims**



1. A mobile broiler apparatus, comprising:

trailer frame means including road engaging wheel means and hitch means for connection to a vehicle;

an open top chamber having sidewalls and a bottom wall mounted on said trailer frame means, said chamber including support means adjacent the upper edge of said open top to said chamber and said sidewalls;

food supporting means mounted on aid support means in spaced relation from said bottom wall of said chamber;

controllable heat generating means positioned in the spacing between said food supporting means and said bottom wall for cooking food supported on said food supporting means;

first guide means mounted on at least one of said sidewalls adjacent the upper edge thereof and extending along the entire side of said open top chamber;

table means and second guide means thereon cooperably engaged with said first guide means for facilitating a relative movement of said table means with respect to said chamber means between a first position closing said open top to said chamber and a second position located along side of said chamber, said table means when in said first position overlapping said food supporting means to permit transportation to distant locations and when in said second position functioning as a support surface to facilitate a distribution of food placed thereon.

4,086,850

METHOD OF AND APPARATUS FOR COMPACTING SCRAP

Hans-Werner Becker, Witten-Bommern, and Werner Oberländer, Wetter, both of Germany, assignors to Maschinenfabrik Becker & Co. Kg, Dortmund-Kley, Germany

Filed Aug. 12, 1976, Ser. No. 713,824

Claims priority, application Germany, Aug. 13, 1975, 2536044

Int. Cl.[2] B30B *9/32*

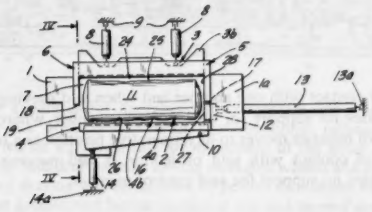
U.S. Cl. 100—42 **8 Claims**

7. A method of compacting a piece of scrap in a generally parallepipedal compaction chamber defined between vertically spaced top and bottom walls, longitudinally and horizontally spaced end walls, and transversely and horizontally spaced side walls, said method comprising the steps of sequentially:

placing said piece of scrap in said chamber;

pivoting said top wall down in contact with said piece of scrap from a raised position inclined to said bottom wall to a lowered position generally parallel thereto, whereby said piece of scrap in said chamber is vertically precompressed;

pivoting a lower portion of one of said side walls relative to said bottom wall from an outer position relatively far from and generally parallel to the other of said side walls to an inner position relatively close to and inclined to said other side wall, whereby the vertically precompressed piece of scrap is also horizontally precompressed;



pivoting said lower portion back into said outer position;

sliding the lower portion of said other side wall toward said lower portion of said one side wall while maintaining said lower portions parallel, whereby said vertically and horizontally precompressed piece of scrap is fully compressed; and

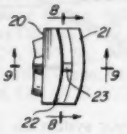
pushing the fully compressed piece of scrap longitudinally out of said chamber through an outlet in one of said end walls.

4,086,851

GOLF BALL MARKERS

John R. Brandell, Glenview, Ill., assignor to Brandell Products Corporation, Rosemont, Ill.

Filed Jan. 21, 1977, Ser. No. 761,313
Int. Cl.[2] B41F *17/30*
U.S. Cl. 101—4 **5 Claims**



1. A ball marker comprising

a. an elongated frame forming an upwardly opening pocket, at one end of said frame, for receiving a ball in position to be marked,

b. said pocket embodying a front rearwardly facing wall portion circularly curved in conformity with the circumference of the ball to be marked and forming an abutment for engaging equatorial portions of a ball in the pocket,

c. a type carrying member mounted in said frame at the side of said pocket diametretically opposite said abutment,

d. a type-piece having a substantially U-shaped portion comprising two substantially parallel, spaced walls,

e. each of said walls having

(1) an outer face facing away from the other of said walls, and

(2) an inner face facing toward the other of said walls,

f. the outer face on one of said walls having a printing character projecting therefrom,

g. said type piece being mounted on a portion of said type carrying member

(1) with said inner faces disposed in abutting juxtaposition to opposite sides of said last mentioned portion, and

(2) with said printing character facing toward said abutment, and

h. means mounted on said frame and operatively connected to said type carrying member for reciprocating said type carrying member longitudinally of said frame into and out of position to markingly press said printing character into engagement with equatorial portions of said ball disposed antipodally with respect to the abutment engaging equatorial portions thereof,

i. the face of said printing character remote from said outer face on said one wall being circularly curved in conformity with the circumference of the ball to be marked,

j. said inner faces of said walls and said outer face of the other of said walls being parallel to said face of said printing character,

k. said opposite sides of said portion of said type carrying member being parallel to said inner faces of said walls,

l. said portion of said type carrying member comprising the body portion of a type bar,

m. said body portion of said type bar

(1) including a longitudinal edge portion, and

(2) having a notch formed in said longitudinal edge portion,

n. said type-piece including

(1) a transverse wall extending between said parallel walls, and

(2) an abutment member, which is substantially complementary in size and shape to said notch, on said transverse wall and projecting between said parallel walls, and

o. said type-piece being mounted on said type bar with

(1) said transverse wall disposed in abutting engagement with said longitudinal edge portion, and

(2) said abutment member disposed in said notch.

4,086,852

LITHOGRAPHIC DAMPENER ROLL HAVING RUBBER SURFACES WITH INCREASED WETTABILITY AND METHOD OF MAKING

Charles L. Hamermesh, Tarzana, and David H. Kaelble, Thousand Oaks, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 13, 1976, Ser. No. 722,997
Int. Cl.[2] B05D *3/06;* **B41L** *25/18*
U.S. Cl. 101—147 **8 Claims**

1. A method of coating the surface of a dampener roll for a lithographic printing machine, comprising:

providing a dampener roll having a surface selected from the group consisting of nitrile rubber and nitrile-PVC rubber;

etching said surface with sulfuric acid;

placing said surface in the afterglow region of an electrodeless glow-discharge chamber; and

introducing acrylonitrile into said chamber, whereby a film of plasma polymerized acrylonitrile is formed on the acid-etched surface.

6. In combination:

a dampener roll for a lithographic printing machine, said dampener roll having an acid-etched surface of rubber selected from the group consisting of nitrile rubber and nitrile-PVC rubber; and

a film of plasma polymerized nitrile-containing material bonded to said surface of said dampener roll.

4,086,853

LITHOGRAPHIC PRINTING PLATE PREPARATION

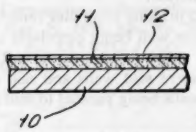
Murray Figov, Ilford; Alan Walter Kent, Frimley; Raymond Owen Stephenson, Ilford, and Peter Edward Watts, Reading, all of England, assignors to Vickers Limited, London, England

Continuation-in-part of Ser. No. 486,636, Jul. 8, 1976, abandoned. This application Jul. 13, 1976, Ser. No. 704,969

Claims priority, application United Kingdom, Jul. 11, 1973, 33130/73

Int. Cl.[2] B41C *1/10*; G01D *15/08, 15/20*

U.S. Cl. 101—463 6 Claims



1. A method of preparing a lithographic printing plate which method comprises the steps of:

(i) providing an electrically-inscribable lithographic printing blank by (a) vapor-depositing onto an under-layer which is electrically non-conductive, hydrophobic and receptive to lithographic oleo ink, a thin over-layer of metal selected from the group consisting of aluminum, chromium and nickel, said over-layer being electrically-conductive, hydrophilic and renderable repellent to said lithographic oleo ink by wetting and (b) coating said over-layer of metal from solution with a solid and electrically partially conductive protective layer formed from a mixture of a finely divided electrically partially-conductive solid material and a film-forming resin material, said protective layer having a weight of from 1 to 15 grams per square meter and a d.c. breakdown voltage of from 10 to 400 volts and which is totally removable by treatment with a solvent which leaves said under-layer and said over-layer intact, said protective layer serving to inhibit mechanical abrasion of said over-layer during inscription of the blank with an electrical stylus and during prior handling and storage of the blank, the layers of said blank having thicknesses selected to permit local removal of said protective layer and said over-layer, by inscription of said blank under such an electrical stylus, so as to expose said under-layer locally;

(ii) passing stylus current between said blank and a stylus while producing relative movement therebetween thereby locally removing said protective layer and said over-layer and exposing said under-layer, said protective layer preventing mechanical abrasion of said over-layer by said stylus during the inscription; and

(iii) treating the inscribed blank with said solvent to remove the remainder of said protective layer from said over-layer whilst leaving the over-layer and said under-layer intact.

4,086,854

VEHICLE CONTROL DEVICE

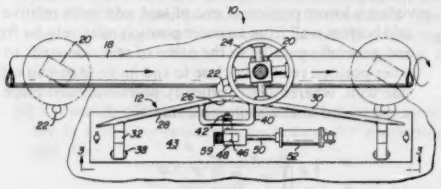
Russell H. Scheel, Easton, Pa., assignor to SI Handling Systems, Inc., Easton, Pa.

Filed Oct. 13, 1976, Ser. No. 731,868

Int. Cl.[2] B61B *13/12*

U.S. Cl. 104—166 7 Claims

4. A method of controlling vehicle traffic along a track comprising providing a speed control member at a location along the track where it is desired to cause a vehicle to slow down or stop, positioning the control member for pivotable movement about an axis which is horizontally disposed so that the control member will be biased downwardly from an operative position wherein said control member can control the speed of a vehicle to an inoperative position wherein said control member cannot control the speed of a vehicle, providing a means for moving said control member from its inoperative to its operative position, providing the vehicle with a cam follower having a projection thereon and rotatable about a vertical axis with a drive wheel on the vehicle, causing the cam follower projection to support the control member in its operative position so long as the control member and cam follower



are in contact with one another and when said moving means provides no support for said control member whereby the control member moves to its inoperative position as a result of lack of contact with said projection if said moving means provides no support for said control member.

4,086,855

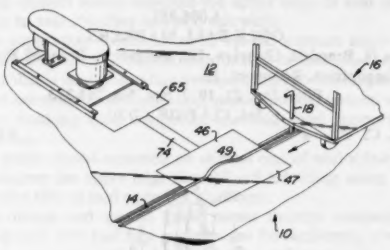
SHALLOW CONVEYOR SYSTEM

John L. Newbegin, Easton, Pa., assignor to SI Handling Systems, Inc., Easton, Pa.

Filed Apr. 5, 1976, Ser. No. 674,018

Int. Cl.[2] B61B *10/04*

U.S. Cl. 104—172 BT 12 Claims



1. A shallow conveyor system for use with two vehicles comprising:

(a) a support surface, a track embedded in the support surface and having a tow pin guide slot, a tow conveyor chain in said track below said slot,

(b) a drive for said chain including two idler sprockets adjacent a portion of said slot, a drive sprocket, said sprockets being disposed to one side of said slot, said sprockets being rotatable about parallel axes forming a triangle with the base of the triangle being an imaginary line extending between the axes of said idler sprockets and generally parallel to said portion of the slot, a motor coupled to said drive sprocket,

(c) a portion of said chain extending from one idler sprocket to said drive sprocket and then to said other sprocket so that most of said portion of the slot along said imaginary line does not contain said chain,

(d) a tow pin transfer mechanism adjacent said portion of the slot, said mechanism including at least one movable finger for transferring a tow pin along said portion of said slot at a speed synchronized with the movement of said chain,

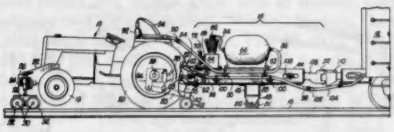
(e) a stationary ramp in said zone below said slot which does not contain said tow conveyor chain.

4,086,856

APPARATUS EMPLOYING AN INTERMEDIATE VEHICLE FOR OPERABLY INTERCOUPLING A TRACTOR OR THE LIKE WITH RAILROAD CARS

Charles E. Chenoweth, 3606 W. 30th Ter., Topeka, Kans. 66614

Filed Sep. 27, 1976, Ser. No. 726,987
Int. Cl.[2] B60F 1/04
U.S. Cl. 105—1 A 22 Claims



1. In apparatus for operably intercoupling a self-propelled tractor-like draft vehicle with a conventional railroad car supported on a pair of rails for movement of the latter along said rails, said draft vehicle having steerable wheels and at least a pair of driving wheels suitable to permit movement thereof over the ground and further having at one end thereof conventional tractor-type three-point hitch mechanical coupling means, said railroad car having at each end thereof conventional railway-type mechanical coupling means incompatible with said tractor-type mechanical coupling means on said draft vehicle:

intermediate vehicle means adapted to be disposed between said draft vehicle and said railroad car and having wheel means for movably supporting the same on said rails;

tractor-drawn-implement-type mechanical coupling means on said intermediate vehicle adjacent one extremity thereof and of type compatible with said coupling means on said draft vehicle for mechanically coupling the latter with said intermediate vehicle; and

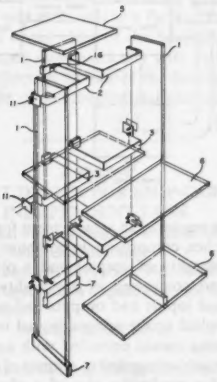
conventional railway-type mechanical coupling means on said intermediate vehicle adjacent the opposite extremity thereof and of type compatible with said coupling means on said railroad car for mechanically coupling the latter to said intermediate vehicle.

4,086,857

SECTIONAL ASSEMBLY

Hitoshi Igarashi, and Kenji Ekuan, both of Tokyo, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Feb. 9, 1977, Ser. No. 766,974
Claims priority, application Japan, Mar. 3, 1976, 51-22773
Int. Cl.[2] A47B 57/00
U.S. Cl. 108—106 11 Claims



1. A sectional assembly which comprises:

at least two vertical glass plates, arranged so as to provide a first gap between the said vertical plates, and at least one horizontal plate located adjacent said vertical plates in said gap; and,

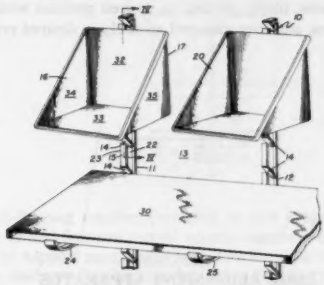
at least one curved holding element connecting the edges of said vertical plates and supporting said horizontal plate which includes a pair of arms and connecting parts located at each end of said arms, said connecting parts including an end of each arm which is bent so as to form a flange to provide surface contact to said vertical glass plates without forming any holes on said vertical glass plates and including a clamp fitting on said flange.

4,086,858

WALL FIXTURE

Robert T. Howitt, Leominster, Mass., assignor to Frem Corporation, Worcester, Mass.

Filed Feb. 2, 1977, Ser. No. 764,822
Int. Cl.[2] A47B 9/00
U.S. Cl. 108—110 6 Claims



1. Wall fixture, comprising:

(a) a molded plastic rail adapted to be fastened to a wall surface in a vertical aspect, the rail being formed with a plurality of narrow slots which enter a broad vertical front surface of the rail facing away from the wall surface, each slot extending inwardly and at a substantial angle to the vertical rail being formed with spaced, parallel side surfaces lying at right angles to the said vertical front surface,

(b) a molded plastic shelf-element having a broad vertical rear surface adapted to lie against the said front surface of the rail, having a plurality of thin ribs extending from the said rear surface for locking engagement with corresponding slots in the rail, and having two vertical flanges lying on either side of and integral with at least one of the ribs in spaced parallel relationship and closely embracing the said side surfaces of the rail.

4,086,859

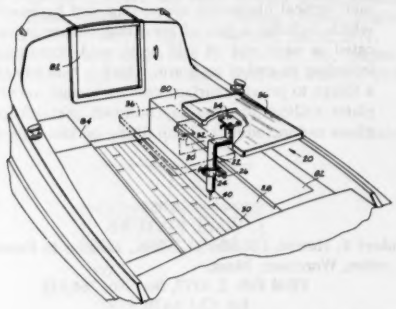
BOAT TABLE

George V. Dondero, P.O. Box 1581, Ketchum, Id. 83340

Filed Jul. 6, 1976, Ser. No. 703,088
Int. Cl.[2] A47B 11/00
U.S. Cl. 108—142 12 Claims

1. In a boat table, side bracket means for mounting on a support, releasable clamp means insertable in said side bracket means, upstanding support means including substantially parallel upper and lower portions connected by an intermediate offset portion providing a lateral pivot extension for said upper portion, said upstanding support means lower portion being rotatably and vertically slidably engageable within said clamp means, a table carried by said upstanding support means, and base support means receiving a lower end of said upstanding

support means, whereby said table can be assembled for swivel mounting within said releasable clamp means upon said base



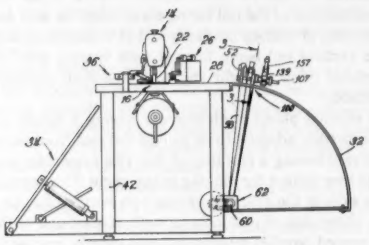
support means, freely pivoted to desired position within said clamp means, and then clamped securely in desired position.

4,086,860

EDGE ALIGNMENT APPARATUS

Robert L. Kosrow, Hoffman Estates, and Alfred W. Bohl, Wauconda, both of Ill., assignors to Union Special Corporation, Chicago, Ill.

Filed May 14, 1976, Ser. No. 686,354
Int. Cl.[2] D05B *35/10*
U.S. Cl. 112—153 **11 Claims**



1. Apparatus mounted for sweeping down the edges of said series of fabric panel means prior to the performance of a work cycle on said fabric panel means in combination with a sewing machine comprising:

means separately accepting side portion means of said fabric panel means;

means guiding a side portion means of said fabric panel means into a predetermined position when moved with respect to said fabric panel means;

means aligning bottom portion means of said fabric panel means whereby said fabric panel means are aligned in a predetermined position;

means for securing said fabric panel means in said predetermined position; and

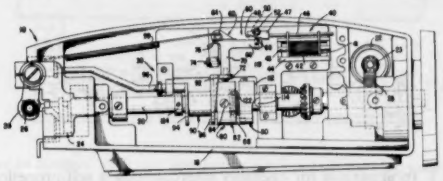
means for transporting said secured fabric panel means to a position adjacent said sewing machine.

4,086,861

ELECTRO-MECHANICAL ACTUATOR

Stanley Joseph Ketterer, Jamesburg, and Kenneth Douglas Adams, Madison, both of N.J., assignors to The Singer Company, New York, N.Y.

Filed Feb. 16, 1977, Ser. No. 769,352
Int. Cl.[2] D05B *3/02*
U.S. Cl. 112—158 E **4 Claims**



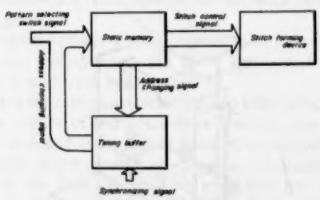
1. In a zig-zag sewing machine having a main drive, stitch forming instrumentalities including a needle bar capable of lateral jogging motion and a variable feed, and means for generating an electrical signal which varies in proportion to desired movements of said stitch forming instrumentalities, an electro-mechanical actuator comprising a single movable stop; a means for positioning said movable stop in proportion to the magnitude of said electrical signal; sensing means for intermittently identifying the position of said movable stop; actuating means slidably disposed on said sewing machine main drive, said actuating means being driven in rotation by said sewing machine main drive; actuator positioning means for slidably positioning said actuating means on said main drive in proportion to the position of said movable stop identified by said sensing means; means for intermittently arresting the sliding motion of said actuating means after being positioned by said actuator positioning means; and means attached to said actuating means for transferring said sliding motion of said actuating means to said stitch forming instrumentalities.

4,086,862

PROGRAMMED ELECTRONIC SEWING MACHINE

Hachiro Makabe, Fussa; Kazuo Watanabe; Hideaki Takenoya, both of Hachioji; Toshihide Kakinuma, Tokyo, and Toshiaki Kume, Tachikawa, all of Japan, assignors to Janome Sewing Machine Co., Ltd., Tokyo, Japan

Filed Aug. 19, 1976, Ser. No. 715,691
Claims priority, application Japan, Oct. 17, 1975, 50-124306
Int. Cl.[2] D05B *3/02*
U.S. Cl. 112—158 E **11 Claims**



1. In a sewing machine, an arrangement for forming patterns made up of stitches, comprising, in combination, a static memory having a plurality of outputs and a plurality of address signal inputs and comprised of a plurality of storage units connected to said inputs and outputs and addressable by address signals applied to the address signal inputs of the memory; stitch-forming means provided with a plurality of stitch control signal inputs connected to outputs of the static memory and operative for producing any of a plurality of different stitches in dependence upon the signals produced at the outputs of the static memory; addressing means operative when activated for applying to the address signal inputs of the static

memory next-address signals derived from the signals produced at the outputs of the static memory; and synchronizing means operative for activating the addressing means in synchronism with the operation of the stitch-forming means.

4,086,863

OCEAN-GOING CATAMARAN

Leopold Nitzki, and Jürgen Alsen, both of Bremen, Germany, assignors to Aktiengesellschaft "Weser", Bremen, Germany

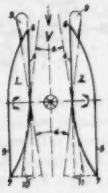
Continuation of Ser. No. 549,391, Feb. 12, 1975, Pat. No. 4,008,674. This application Sep. 23, 1976, Ser. No. 725,988

Claims priority, application Germany, Feb. 16, 1974, 2407498

The portion of the term of this patent subsequent to Feb. 22, 1994, has been disclaimed.

Int. Cl.[2] B63B *1/10*

U.S. Cl. 114—61 **8 Claims**



1. An ocean-going catamaran, comprising a bridge structure having a main axis; a pair of spaced-apart hulls connected to said structure on opposite sides of said main axis, each hull having a longitudinal axis which is parallel to said main axis, a forward hull portion and a rearward hull portion, each hull being asymmetrical relative to its longitudinal axis, and the forward portion of each hull being straight at one side and curved at the opposite side in the region of the waterline, the straight sides of the respective forward portions each extending parallel to their respective longitudinal axes and being inclined in upright direction relative to each other and to said main axis at an angle other than zero as considered in the plane of the waterline, said hulls bounding a Venturi-shaped channel between each other for generating a suction force so as to improve catamaran propulsion; and a pair of forefoot bulges each provided on the forward hull portion of the respective hull, each of said bulges having corresponding pairs of inboard and outboard sides, one pair of corresponding sides lying approximately in the same vertical plane as the straight sides and the other pair of corresponding sides being inclined relative to each other and to said main axis at a further angle other than zero as considered in the plane of the waterline, each of said bulges being arranged asymmetrically with respect to a vertical plane passing through an end of the forward hull portion and in the direction of the longitudinal axis of the respective hull.

4,086,864

SUPPORT DEVICE FOR SHIP-CARRIED INDEPENDENT TANK

Takanori Ito, Osaka, Japan, assignor to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed Jan. 27, 1977, Ser. No. 763,005

Claims priority, application Japan, Feb. 10, 1976, 51/13401; Feb. 10, 1976, 51-13402

Int. Cl.[2] B63B *25/08*

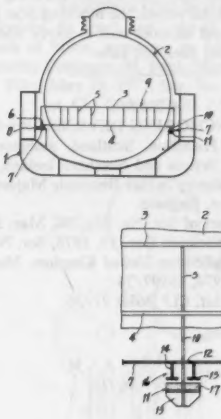
U.S. Cl. 114—74 A **10 Claims**

1. A support device for a spherical or cylindrical ship-carried independent tank, comprising:

a first support member consisting of ring means provided on and horizontally projecting from the outer periphery of said tank;

a second support member consisting of a support deck secured to the ship's hold;

means for supporting the tank on the upper surface of said support deck including circumferentially spaced support chocks projecting from the lower surface of said ring means and pressure-resistant heat insulating elements interposed between the lower surfaces of said support chocks and said support deck;



an anti-floating member provided on and projecting from one of said first and second support members through the other support member without touching the latter member, said anti-floating member being disposed between an adjacent pair of said support chocks, and

an engagement section formed on the free end of said anti-floating member so as to engage said other support member when the tank tends to float up.

4,086,865

MOORING SYSTEM

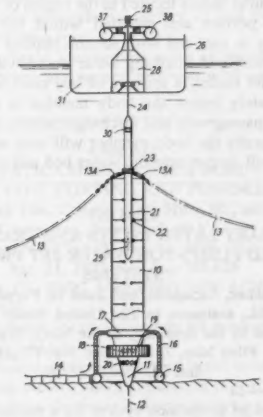
John Arnold Statham, 68 Battenhall Avenue, Worcester, England

Filed Apr. 13, 1977, Ser. No. 787,047

Claims priority, application United Kingdom, Apr. 23, 1976, 16513/76

Int. Cl.[2] B63B *21/04*

U.S. Cl. 114—230 **20 Claims**



1. Apparatus for mooring a vessel comprising a support unit

for installation below the surface of the sea, a mooring post mounted in said support unit for vertical sliding movement, a mooring hawser centrally attached to the upper end of said mooring post whereby the mooring hawser may apply a vertical lifting force to the mooring post, said hawser being of sufficient strength to lift the mooring post when the latter is immersed in the sea, and means attached to said hawser for location by a vessel to be moored, whereby the vessel may haul in the hawser and lift the head of the mooring post into a reception chamber in the vessel, the mooring post being freely slidable relative to said support unit to move vertically with the vessel as the vessel rises and falls.

4,086,866

ANCHORING DEVICES

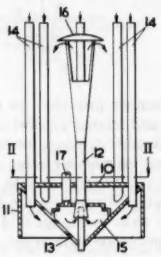
Ralph Alan Nixon, Hamilton, Scotland, assignor to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Industry in Her Britannic Majesty's Government of the, London, England

Continuation-in-part of Ser. No. 561,788, Mar. 25, 1975, abandoned. This application Dec. 17, 1976, Ser. No. 751,996

Claims priority, application United Kingdom, Mar. 28, 1974, 13847/74; Nov. 13, 1974, 49197/74

Int. Cl.[2] B63B *21/26*

U.S. Cl. 114—295 **19 Claims**



1. A deep burying anchoring device for providing an anchorage in the bed of a volume of water comprising

a body member including an open-ended cylindrical skirt portion,

a conical portion mounted coaxially within the skirt portion in an inverted state with its apex extending downwardly,

a suction passageway extending at least part way through the body member and having an open lower end extending through the apex of the conical portion, and fluidising water outlet means located in the region of the base of the conical portion and shielded within the skirt portion whereby in use, and with suction applied to the suction passageway and fluidising water made available through the outlet means, a mixture of bed material/water from immediately below the body member is drawn up the suction passageway and discharged above the body member whereby the body member will bury and continue to bury itself deeper into the water bed material.

4,086,867

BOUNDARY LAYER INLETS AND TRANSVERSE MOUNTED PUMPS FOR WATER JET PROPULSION SYSTEMS

John G. Stricker, Annapolis, and John G. Purnell, Catonsville, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 7, 1977, Ser. No. 775,218

Int. Cl.[2] B63H *11/04*

U.S. Cl. 115—14 **11 Claims**

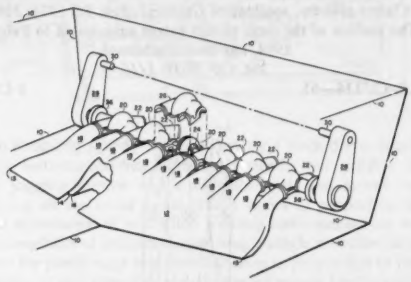
1. A water jet propulsion system for a marine vehicle comprising:

at least one water pump, each pump being positioned near the stern of the vehicle and having a water output and at least one water intake;

at least one power source connected to and used for driving each water pump;

a nozzle connected to the output of each pump;

at least one water inlet, with the aspect ratio of each water inlet being larger than 10, each inlet being located on the rear portion of the vehicle hull, each inlet facing toward the bow end of the vehicle, the positions of each inlet adjusted so that only one inlet will intersect any straight



line extending parallel to the bow-stern axis of the vehicle, and with the height of each inlet adjusted so that when said vehicle is moving at its maximum speed, most of the water entering each inlet will come from the boundary layer close to the vehicle hull;

at least one pump intake manifold which directs water entering said water inlets to the intakes of each pump, with the pumps and the inlets positioned relative to each other so that water flowing through the intake manifolds will continuously move toward the stern of the boat as it flows toward the pump intakes.

4,086,868

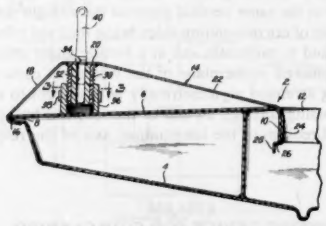
OAR LOCK ATTACHMENT

Samuel F. Lutters, 167 Pinewood Trail, Trumbull, Conn. 06611

Filed Feb. 9, 1977, Ser. No. 767,154

Int. Cl.[2] B63H *16/06*

U.S. Cl. 115—24.4 **7 Claims**



1. An oarlock mounting device for a boat having a gunwale with inner and outer edges, comprising:

an elongated clamp member having hook-like means at its ends for engagement with corresponding shaped edges of a gunwale;

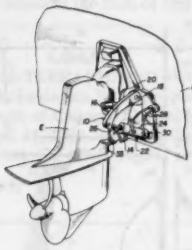
extensible means on said clamp member extending downwardly therefrom between said hook-like means for engagement with the upper surface of a gunwale between said edges and having a portion movable downwardly relative to said clamp member to tension said clamp member and hold said hook-like means against said edges; and

socket means on said device for receiving an oarlock.

4,086,869
BOAT TRIM ADJUSTING APPARATUS

James Edward Woodruff, 3057 Reese Dr., Portsmouth, Va. 23703

Filed Feb. 7, 1977, Ser. No. 766,547
Int. Cl.[2] B63H 5/12
U.S. Cl. 115—41 HT 7 Claims



1. Apparatus for adjusting the elevation of an engine pivotally mounted on the rear portion of a boat to adjust the trim of the boat, said adjusting apparatus comprising:

an adjusting bracket of generally U-shaped configuration having a base portion and a pair of arms extending upwardly and outwardly from said base portion, each of said arms increasing in width as it extends upwardly, the upper forward end of each arm being pivotally connected to the rear portion of the boat to enable said adjusting bracket to be pivoted relative to the boat,

each of said arms having a rearwardly and laterally outwardly extending wing portion,

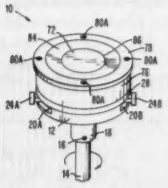
means connecting said adjusting bracket to the engine, and

means connected to the boat and to the rear end of said wing portions (said arms) for selectively pivotally moving said adjusting bracket and the engine connected thereto to vary the elevation of the engine and adjust the trim of the boat.

4,086,870
NOVEL RESIST SPINNING HEAD

Benjamin John Canavello, Stony Point; Michael Hatzakis, Ossining; Arthur Richard Siegel, and Connell Watters, both of Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1977, Ser. No. 811,732
Int. Cl.[2] B05C 11/08
U.S. Cl. 118—52 12 Claims



1. A resist spinning head for supporting a wafer when spin coating onto the wafer surface, comprising:

spinning head base support means for attachment to a spinner motor shaft;

a wafer platform adapted for mounting on said spinning head base support means;

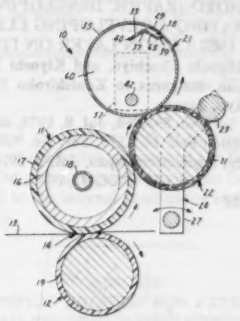
wafer hold down means for maintaining said wafer on said wafer platform, said wafer hold down means including a tapered top plate having an opening through which a resist is applied onto the wafer surface, said tapered top plate being tapered in an axial direction leading into a knife-edge contact to the surface of the wafer around said opening so as to seal the top of said wafer and prevent resist from flowing under said top plate;

whereby the resist is guided by the tapered top surface during spinning to the outer edge of said top plate and off the spinning head.

4,086,871
LUBRICATOR ROLL

Robert L. Rydeen, St. Paul, and John D. Vandervort, Cottage Grove, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 18, 1977, Ser. No. 798,176
Int. Cl.[2] G03G 13/20, 15/20
U.S. Cl. 118—60 14 Claims



1. A roll for dispensing liquid contained within the roll during roll rotation, comprising:

a cylinder having an interior and exterior surface, and a longitudinal axis;

two end structures joined to said cylinder and adapted to permit rotation of said cylinder about its longitudinal axis;

a first reservoir defined by said interior surface of said cylinder for holding a quantity of liquid;

a strip mounted within said cylinder along said longitudinal axis having a first and second flanged portion;

said first flanged portion contacting said interior surface of said cylinder to form a second reservoir;

said second flanged portion is directed inward forming a scoop to feed liquid contained within said first reservoir to said second reservoir during rotation of the cylinder;

said cylinder having a longitudinal array of apertures which communicate said exterior surface of said cylinder with said second reservoir;

said strip having a longitudinal array of apertures therein, communicating said second reservoir with said first reservoir.

4,086,872
ELECTROSTATIC COATING WITH POST CHARGER WEB OR COIL COATING AND POWDER FEED

Peter Naw Yank Pan, Country Club Hills, Ill., assignor to The Continental Group, Inc., New York, N.Y.

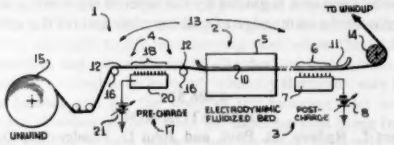
Division of Ser. No. 676,513, Apr. 13, 1976. This application Apr. 21, 1977, Ser. No. 789,625
Int. Cl.[2] B05C 5/00; B05D 3/06, 3/14
U.S. Cl. 118—630 13 Claims

1. An electrodynamic coating system for coating a substrate, comprising in combination:

coating applicator means disposed adjacent to said substrate for applying thereto charged particles of a given polarity so as to produce electrostatic forces attracting and holding said charged particles to said substrate; and

postcharging means disposed downstream of said applicator

and adjacent to said substrate for applying thereto a charge of said given polarity whereby to effect an increase



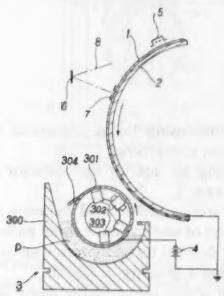
in the electrostatic forces holding said applied particles to said substrate.

4,086,873

ELECTROPHOTOGRAPHIC DEVELOPING DEVICE INCORPORATING A DEVELOPING ELECTRODE HAVING AN INSULATION LAYER ON ITS SURFACE

Sizuo Morita; Hiroshi Thuchiya, and Kiyoshi Kimura, all of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 593,968, Jul. 8, 1975, abandoned. This application Feb. 14, 1977, Ser. No. 768,279
Claims priority, application Japan, Jul. 9, 1974, 49-78429
Int. Cl.[2] G03G *15/09*
U.S. Cl. 118—658 **5 Claims**



1. An electrophotographic developing apparatus comprising a photosensitive plate having a conductive layer thereon and a soft photoconductive layer on said conductive layer, a magnetic brush positioned adjacent to the surface of said photoconductive layer, said magnetic brush comprising an electrode and a highly insulating material covering said electrode and disposed opposite and adjacent to said photoconductive layer, a developer/toner including suspended magnetic particles, means forming part of said magnetic brush for carrying said developer/toner onto said photoconductive layer, and means for preventing injury to said soft photoconductive layer by said suspended magnetic particles, said last means comprising means for applying a biasing voltage between said electrode and said photosensitive plate for reacting on said particles, said voltage being of sufficient strength to prevent penetration and/or scratching of said photoconductive layer while still permitting deposition of said developer/toner onto said photoconductive layer.

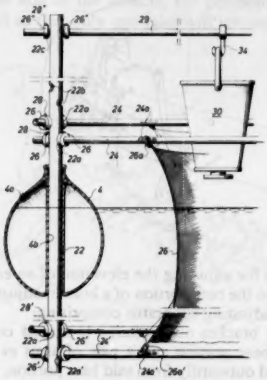
4,086,874

SUPPORTING STRUCTURE FOR FISH NETS OR THE LIKE

Karl Thore Sterner, Fabovagen 13, S-781 00 Borlange, Sweden

Filed Aug. 13, 1976, Ser. No. 714,139
Claims priority, application Norway, Aug. 15, 1975, 752844
Int. Cl.[2] A01K *63/00*
U.S. Cl. 119—3 **7 Claims**

1. A collapsible supporting structure for a fish net or the like comprising at least four bodies spaced from each other and floating on a water surface, a vertical supporting element supported on each body and projecting above the water surface, each supporting element having at least two angularly related sockets defined thereon above said water surface, elongated rigid connecting elements extending between adjacent pairs of supporting elements with opposite ends respectively received into respective sockets on said supporting elements, releasable lock means cooperating with said supporting ele-



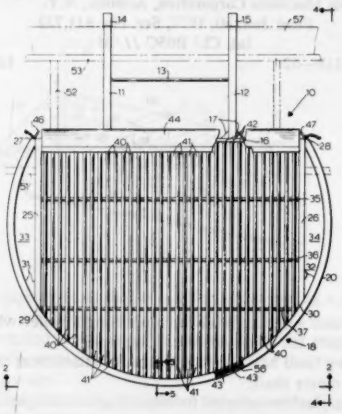
ments and associated ends of said connecting elements to form a frame which is generally stiff in the horizontal plane and keeps said bodies at a predetermined distance from each other, and a flexible fish net having an upper peripheral edge detachably connected to said connecting elements and a center portion located below said water surface so that said structure can readily be collapsed by detachment of said fish net from said connecting elements and release of said releasable lock means.

4,086,875

GRADING LIVE FISH UNDER WATER

Jon Morrow Lindbergh, Bainbridge Island, Wash., assignor to Union Carbide Corporation, New York, N.Y.

Filed Sep. 16, 1976, Ser. No. 724,088
Int. Cl.[2] A01K *75/00*; B07B *13/04*
U.S. Cl. 119—3 **26 Claims**



11. A fish grader for use within a flexible net in grading live fish under water, comprising:

a generally arcuate planar rim joined at both ends to a horizontal cross-member defining a chord thereacross, said rim providing an exterior channel around an arc,

grader-suspension means extending up from said cross-member,

a series of vertical rods extending between and secured to both said rim and said cross-member, said rods being evenly spaced apart to define grading passages between successive rods, through which fish can swim if they are narrow enough but which bar them if they are wider than the spacing between said rods, and

net anchor means adjacent the ends of said rim.

4,086,876

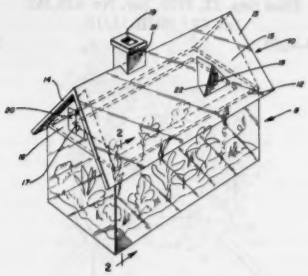
AQUARIUM-TERRARIUM STRUCTURE

Leon Moore, 3922 W. Lexington St., and George E. Smith, Jr., 4220 W. Gladys, both of Chicago, Ill. 60624

Filed Jul. 21, 1976, Ser. No. 707,201

Int. Cl.[2] A01K *64/00*

U.S. Cl. 119—5 **8 Claims**



1. A removable environment-regulating covering device for use over a receptacle having an upstanding edge, comprising a cover member dimensioned to overlay the receptacle, said cover member including planar end portions and side roof portions, said roof portions having edge portions with undersurfaces extending angularly downwardly and outwardly beyond the receptacle's upstanding edge and adapted to facilitate gripping and placement of said cover member over the receptacle, at least one of said roof portions being provided with at least one opening therein adapted to receive adjustable ventilation control pieces, and a continuous support member extending inwardly from said roof portions at an angle relative thereto and inwardly from said end portions, said support member cooperating with said edge portion undersurfaces to facilitate proper positioning of said cover member over the receptacle and being adapted to rest on the upper edge of said receptacle to effectively enclose said receptacle, whereby said support member maintains said cover member in place on such a receptacle and provides a substantially moisture impermeable juncture with the receptacle, said ventilation control pieces being selectively adjustable for controlling ventilation of the interior portions of the resulting enclosure.

4,086,877

METHOD OF OPERATING AN INTERNAL COMBUSTION ENGINE FED WITH A REFORMED GAS

Hans-Joachim Henkel, and Eugen Szabo De Bucs, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 7, 1976, Ser. No. 647,104

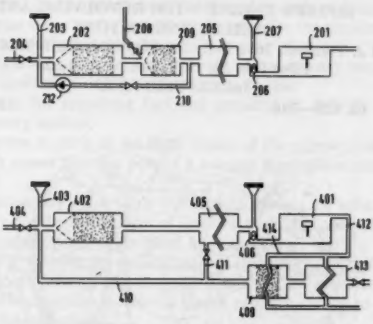
Claims priority, application Germany, Jan. 14, 1975, 2501250

Int. Cl.[2] F02B *43/08*

U.S. Cl. 123—1 A **21 Claims**

1. A method of operating an internal combustion engine with a fuel gas which is obtained by the catalytic reaction of hydrocarbons and a gas containing oxygen in a reformed gas generator comprising the steps of:

(a) endothermically converting methanol into a gas mixture containing carbon monoxide and hydrogen utilizing the heat content of at least one of the group of gases consisting of the fuel gas from the reformed gas generator and the exhaust gas from the internal combustion engine to thereby convert that heat content to useable chemical energy;



(b) mixing said gas mixture with at least one of the group consisting of the hydrocarbons and the fuel gas; and

(c) feeding the gas mixture along with the fuel gas and combustion air to the internal combustion engine for combustion therein.

4,086,878

COMBUSTION PROCESS FOR EXTERNALLY CONTROLLED RECIPROCATING PISTON INTERNAL COMBUSTION ENGINE OPERATING WITH HYDROGEN INJECTION

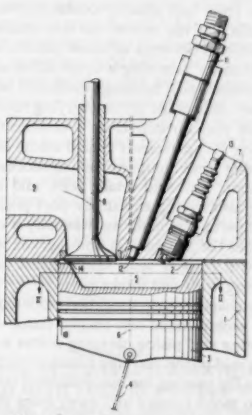
Erwin Eisele, Stuttgart; Klaus Binder, Deizisau, and Klaus Drexl, Waiblingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Apr. 15, 1976, Ser. No. 677,139

Claims priority, application Germany, Apr. 17, 1975, 2517066

Int. Cl.[2] F02B *17/00*

U.S. Cl. 123—1 A **19 Claims**



1. A combustion method for a reciprocating piston internal combustion engine with applied ignition and operating with an injection of hydrogen, in which air is supplied to cylinders of the engine independently of the hydrogen, and an air ring rotating about the cylinder axis is produced which has a density that increases radially outwardly, the combustion method comprising the steps of injecting the hydrogen into a central area of the air ring, and igniting the mixture within a transition

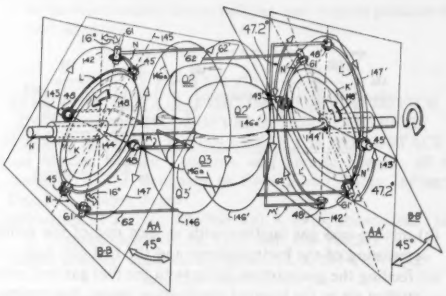
area between a central hydrogen core and an outer rotating air ring.

4,086,879

ROTARY ENGINE WITH REVOLVING AND OSCILLATING PISTONS

Paul J. Turnbull, 2681 Kelly St., Hayward, Calif. 94541

Filed Feb. 24, 1977, Ser. No. 771,623
Int. Cl.[2] F02B *53/00*
U.S. Cl. 123—216 **12 Claims**



1. A rotary engine comprising:

(a) a cylindrical hollow housing having closed ends;

(b) a power shaft extending axially through said housing and having its ends rotatably supported by the ends of said housing;

(c) a stationary disc-shaped stator mounted near each end of said shaft and having a center bore for rotatably receiving the shaft, the two stators being inclined toward each other and the planes of said stators making a 45° angle with respect to the shaft axis;

(d) a pair of piston carrying rotors rotatably mounted on said shaft, each rotor having an annular recess with the annular recesses of the two rotors facing each other;

(e) a pair of diametrically opposed pistons mounted in each annular recess of each piston carrying rotor and having their outer ends received in the annular recess of the adjacent rotor and slidably contacting with the adjacent wall surface of the recess, the four pistons forming four compartments between adjacent pistons in the two annular recesses for receiving a combustible mixture;

(f) a ring-shaped port housing positioned between the adjacent inner ends of the piston carrying rotors and including an intake port for delivering a combustible mixture into successive compartments as said rotors and pistons rotate for causing these compartments to successively move into registration with said intake port, said ring-shaped port housing also having an exhaust port positioned so that as the compartments make substantially a complete revolution about the axis of said housing, the moving compartments will register with said exhaust port just prior to registering with said intake port;

(g) a ring-shaped rotor rotatably mounted on the circular ring of each inclined disc-shaped stator with means interconnecting said piston carrying rotors with said shaft for causing said piston carrying rotors to oscillate during their rotation for causing the two pistons of one piston carrying rotor to move toward and away from the two pistons of the other piston carrying rotor so that each successive compartment as it passes said intake port will be enlarging to receive the combustible mixture and then will be contracting for compressing the mixture;

(h) a spark plug associated with each compartment;

(i) means for firing each spark plug when its associate compartment has compressed the combustible mixture thereby causing the mixture to explode and burn for moving the two pistons forming this compartment, to relatively move away from each other for enlarging the compartment while it's still rotating about the housing axis for causing these two pistons to deliver rotative power to said shaft through said means that interconnects said piston carrying rotors with said ring-shaped rotor; and

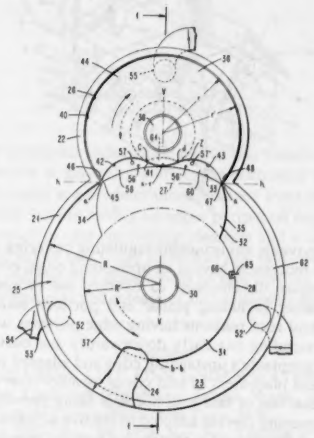
(j) said means that interconnects said piston carrying rotors with said ring-shaped rotor causing the two pistons that form the compartment that has just passed through its firing stroke, to move relatively toward each other while they rotate about the housing axis for compressing the burnt gases as the compartment means passes said exhaust port for exhausting the burnt gases through this exhaust port.

4,086,880

ROTARY PRIME MOVER AND COMPRESSOR AND METHODS OF OPERATION THEREOF

Kenneth Clayton Bates, 28 Scenic Dr., Poughkeepsie, N.Y. 12603

Filed Sep. 22, 1975, Ser. No. 615,362
Int. Cl.[2] F02B *53/10*
U.S. Cl. 123—205 **29 Claims**



1. Apparatus of the class described comprising a hollow housing comprising a tube-like central casing and end closure means for the ends thereof, first and second intermeshing rotors with spaced parallel axes interposed between and rotatably supported by said end closure means and circumferentially surrounded by said central casing, said first rotor comprising a cylindrical hub portion and a radially-extending piston portion having oppositely-facing, radially-extending concave reaction surfaces and said second rotor comprising a cylindrical hub portion and a radially-extending piston portion having oppositely-facing radially-extending convex reaction surfaces, means including said second rotor for inducting a gaseous charge into the housing around the hub portion of said second rotor, and means for drivably connecting said rotors whereby the same are constrained to rotate simultaneously in opposite directions in timed relation, the circumferential surfaces of said rotors and the inner walls of said housing being formed to cooperate so that during each revolution of said first rotor a freshly inducted gaseous charge is trapped and initially compressed in a closed compression chamber between the rotors with the first rotor functioning as a fixed reaction surface while the second rotor functions as a piston to progressively reduce the volume of said chamber and is thereafter further compressed between the rotors with said second rotor functioning as a fixed reaction surface while the first rotor functions as a piston to further progressively reduce the volume of said chamber.

22. The method which comprises rotating intermeshing

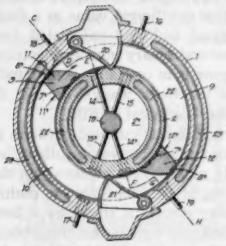
rotors in a housing to cyclically form therein an expanding combustion volume and a simultaneously contracting compression volume, establishing communication between said volumes as the same expand and contract, flowing a gaseous combustion supporting medium under pressure from said contracting compression volume into said expanding combustion volume, injecting a combustible fuel into the compression and combustion volumes, and igniting the resulting combustible mixture in said volumes.

4,086,881

ROTARY ENGINE

Jean J. Rutten, Liege, Belgium, assignor to Fabrique Nationale Herstal S.A., en abrege FN, Herstal, Belgium

Filed Jul. 6, 1976, Ser. No. 702,681
Claims priority, application Belgium, Aug. 5, 1975, 832139
Int. Cl.[2] F02B *53/00*
U.S. Cl. 123—228 **3 Claims**



1. Rotary internal combustion engine comprising: a stationary cylindrical outer casing; a stationary closed cylindrical inner casing within said outer casing and coaxial therewith; at least two interconnected piston means, rotatably mounted around said inner casing, in gas-tight contact with said inner and outer casings; an output shaft connected to said piston means, at least two swing valves pivotally mounted on said outer casing and retractable, from a position in which they gas-tightly engage said inner casing, to a position in said outer casing and vice versa; fuel supply means for directing fuel to first inlet valve means in said outer casing; exhaust valve means in said outer casing to exhaust spent gases from said engine; second inlet and outlet valve means in said inner casing communicating with the space between said casings, said inner casing forming a single pressure chamber; and means for opening and closing said valve means in timed relation to rotation of said piston whereby gas is drawn in through said first inlet valve means, compressed between a piston and one side of a swing valve then discharged into said chamber through said second inlet valve means then withdrawn through said second outlet valve means on the other side of said swing valve, the pressure within said chamber pulsing between a value P and $P-\Delta p$, Δp being but a fraction of P.

4,086,882

COMPOUND COMBUSTION ENGINES AND METHODS OF COMPOUNDING SAME

William H. McCrum, R.D. #2, Candlewood Mountain Rd., New Milford, Conn. 06776

Filed Oct. 18, 1976, Ser. No. 734,638
Int. Cl.[2] F02B *53/00*; F02G *3/02*
U.S. Cl. 123—216 **3 Claims**

1. A two rotor internal-combustion compound rotary engine comprising, in combination:

a) a primary engine section and a secondary engine section operatively connected by an eccentric shaft as the power shaft common to both said sections, the primary section serving as the prime mover in the manner of a conventional single-rotor rotary engine operating according to the known four-event work cycle;

b) a three-flanked rotor connected to said power shaft and rotatably contained in each said section for effecting work-cycle events;

c) a two-lobed housing cavity contained in each said engine section serve as the operating chamber for the respective rotor during rotation thereof;

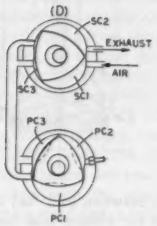
d) an ignition system connected only to the primary section for ignition of rich fuel/air charges therein;

e) means for supplying fuel and primary air only to the primary section;

f) a recess in each of the three flanks of the primary rotor, each recess forming part of a moving combustion chamber;

g) a secondary rotor with non-recessed flanks for substantially preventing transfer of gases between the lobes of the secondary rotor's two-lobed housing cavity;

h) a short conduit for connecting and thereby compounding adjacent primary and secondary sections for transferring working medium exhausted by the primary section to the secondary section;



i) eccentric shaft rotor journals oppositely positioned by a separation angle of 180° for rotors to be mounted thereon so as to be oppositely-phased in their operation;

j) secondary rotor housing provided with an air intake port and an air outlet port disposed oppositely and peripherally in one lobe of said two-lobed housing cavity, said intake port connected to a conventional air-filter system and said outlet port connected to said conduit whereby the secondary engine section's rotor is enabled to induct supplemental secondary air through said air-filter system during each intake event in said one lobe and cause ejection of said air directly into said conduit and working medium during each compression event in said one lobe to support the burning of leftover combustibles in said medium; and said

k) secondary rotor housing also provided with a peripheral inlet port in the other lobe of said cavity and connected to said conduit for admitting therefrom the air-treated said working medium during each expansion event in said other lobe; said housing additionally provided with a peripheral exhaust port disposed in the opposite side of said other lobe for release of the spent medium during successive exhaust events into an exhaust system connected to said exhaust port.

4,086,883

RECIPROCATING INTERNAL-COMBUSTION ENGINE CHARGED WITH FUEL IN POWDER FORM

Anton Steiger, Illnau, Switzerland, assignor to Sulzer Brothers Ltd., Winterthur, Switzerland

Filed Aug. 16, 1976, Ser. No. 714,811
Claims priority, application Switzerland, Mar. 5, 1976, 2754/76
Int. Cl.[2] F02B *45/00*; F02D *19/04*
U.S. Cl. 123—23 **11 Claims**

1. In a reciprocating internal combustion engine having a cylinder head and a combustion chamber, the combination comprising

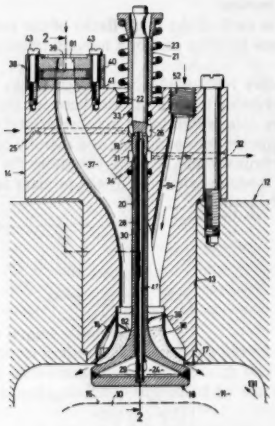
a fuel-feeding duct within said cylinder head and communicating with said combustion chamber, said duct having a valve seat adjacent said combustion chamber;

a fuel valve having a valve body for selectively seating on said valve seat to close said duct;

a fuel dosing means for delivering charges of fuel to said duct;

a compressed air duct communicating with said fuel-feeding duct at a juncture point spaced from said valve seat;

a control valve for controlling a flow of air to said compressed air duct;



a closure means between said fuel dosing means and said juncture point for closing said fuel feeding duct to said fuel dosing means; and

control means connected to said fuel valve, said control valve and said closure means for maintaining said valves in an open position with said closure means closing off said fuel-feeding duct to said dosing means to allow a complete injection of fuel from said fuel-feeding duct into said combustion chamber.

4,086,884

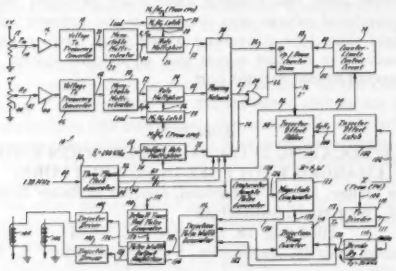
METHOD AND APPARATUS FOR CONTROLLING THE AMOUNT OF FUEL METERED INTO AN INTERNAL COMBUSTION ENGINE

Roger A. Moon, Ypsilanti, and Frank J. Garofalo, Farmington Hills, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jun. 14, 1976, Ser. No. 695,880

Int. Cl.[2] F02B *3/00*

U.S. Cl. 123—32 EB **10 Claims**



1. A method for controlling the amount of fuel metered, through electrically-controllable valve means, to an internal combustion engine, said method comprising the steps of:

generating a plurality of engine condition electrical signals, each of said signals being representative of a condition under which said engine is operating;

calculating a first coefficient value representing a first coefficient in a first product, said calculating of said first coefficient value being performed, using one or more of said engine condition electrical signals, by a digital computer programmed to calculate said first coefficient value from a function or functions describing a desired relationship between said first coefficient value and said one or more of said engine condition electrical signals;

calculating a second coefficient value representing a second coefficient in a second product, said calculating of said second coefficient value being performed, using one or more of said engine condition electrical signals, by a digital computer programmed to calculate said second coefficient value from a function or functions describing a desired relationship between said second coefficient value and said last-mentioned one or more of said engine condition electrical signals;

as outputs of said digital computer, making available said calculated first coefficient value as a first binary number electrical signal and said calculated second coefficient value as a second binary number electrical signal;

while said engine is in operation, continually repeating the above steps to effect changes in said first and second binary number electrical signals;

with an electrical circuit coupled between said digital computer and said electrically-controllable valve means and continuously or at a rate greater than the rate at which said repeating of the steps occurs, multiplying said first binary number electrical signal by a first of said engine condition electrical signals, thereby, obtaining a first product electrical signal, and multiplying said second binary number electrical signal by a second of said engine condition electrical signals, thereby, obtaining a second product electrical signal; and

with said electrical circuit and said electrically-controllable valve means, determining the difference between said first and second product electrical signals and metering fuel to said engine in proportion to the difference between said first and second product electrical signals.

4,086,885

CARBURETOR FOR STRATIFIED INTERNAL COMBUSTION ENGINE

Masaaki Noguchi, Nagoya; Masaharu Sumiyoshi, Toyota; Yukiyasu Tanaka, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation of Ser. No. 531,741, Dec. 11, 1974, abandoned.

This application Dec. 30, 1976, Ser. No. 755,583

Claims priority, application Japan, Dec. 13, 1973, 48/139888; Dec. 27, 1973, 49/26974; Feb. 6, 1974, 49/15653; Feb. 11, 1974, 49/16480; Feb. 18, 1974, 49/19968; Jun. 18, 1974, 49/69973; Aug. 5, 1974, 49/90173; Sep. 2, 1974, 49/101107

Int. Cl.[2] F02B *3/00, 75/02*

U.S. Cl. 123—32 ST **53 Claims**

1. In a torch ignition internal combusion engine comprising:

a cylinder;

a piston;

a cylinder head secured to said cylinder and defining in combination with said piston and cylinder a combustion chamber;

a suction port in communication with said combustion chamber adapted to receive a lean air-fuel mixture;

an intake valve disposed in said suction port and comprising a valve head and a valve stem integrally associated therewith;

a suction passage having an open end thereof disposed within said suction port in the vicinity of said valve head adapted to receive a rich mixture;

a trap chamber disposed in said cylinder head adapted to receive said rich mixture, said trap chamber having at least one suction aperture through which said rich mixture

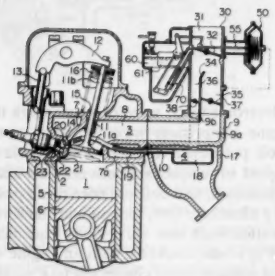
is introduced into said trap chamber when said intake vavle is opened, said trap chamber also having at least one discharge aperture through which residual gas remaining in said trap chamber is discharged into said combustion chamber; and

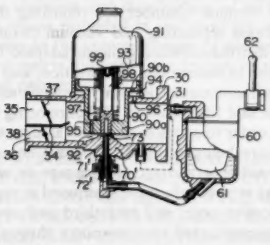
a spark plug having a set of electrodes exposed to the inside of said trap chamber for igniting the rich mixture introduced thereinto;

a carburetor comprising:

means defining an air passage connected at one end to said suction port and suction passage, and the other end thereof communicating with the atmosphere, said air passage passing air from the atmosphere to said suction port and suction passage;

fuel supplying means opening to said air passage for supplying fuel to said air passage to thereby form an air-fuel mixture directly downstream of said fuel supplying means, said air-fuel mixture having a relatively rich portion at a central portion of a cross-sectional area substantially perpendicular to the flow of said air-fuel mixture in said air passage and being relatively lean in the outer portions of





said cross-sectional area, the amount of fuel supplied being so controlled as to be in response to the amount of air passing through said air passage;

partition means disposed in said air passage downstream of said fuel supplying means extending substantially parallel to the flow of said air-fuel mixture and be in position between the fuel supply means opening and the opposing wall of the air passage for forming a first intake pipe connected to said suction port and a second intake pipe connected to said suction passage, said second intake pipe being disposed closer to said fuel supplying means than said first intake pipe, said second intake pipe having a rich air-fuel mixture receiving upstream end, said upstream end having a cross-sectional area in line with the flow of said rich portion of said air-fuel mixture; and

a first and a second throttle valve respectively disposed in said first and second intake pipes, said leaner air-fuel mixture being introduced into said suction port in response to opening of said first throttle valve and said richer air-fuel mixture being introduced into said suction passage in response to opening of said second throttle valve.

4,086,886

COOLING INSTALLATION

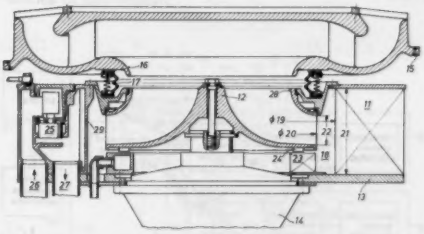
Franz Edmaier, Markdorf, and Jürgen Wahnschaffe, Cologne, both of Germany, assignors to Motoren- und Turbinen-Union Friedrichshafen GmbH, Germany

Filed Jul. 18, 1975, Ser. No. 597,172

Claims priority, application Germany, Jul. 25, 1974, 2435839

Int. Cl.[2] F01P *7/04, 7/10;* F28F *13/12*

U.S. Cl. 123—41.65 **18 Claims**



1. A cooling installation for liquid-cooled internal combustion engines, which comprises an annular cooler block means which is traversed by cooling air from the inside toward the outside and which includes an annular cooler means and a radial-blower means with a rotor means, said rotor means being arranged on the inside of the annular cooler means and being operable to axially suck-in cooling air through an inlet opening provided in the vehicle housing, characterized in that a base plate means is rigidly connected with a vehicle part supporting the cooling installation, said base plate means being rigidly connected together with the annular cooler block means into a self-supporting rigid unit, a substantially bladeless annular space being provided between the rotor means and the annular cooler block means, and in that the ratio of cooler inlet diameter to rotor discharge diameter lies within the range of 1.15 to 1.2 and the ratio of cooler inlet width to rotor discharge width lies within the range of 2.7 to about 3.3.

4,086,887

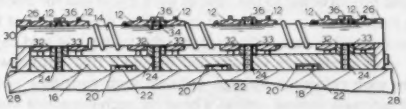
ROCKER ARM SHAFT SUPPORT

Alan G. Schoonover, 17110 Shadow Ct.; Gary E. Ericksen, 7771 Polinda St., both of Milwaukie, Oreg. 97222, and Kenneth E. Heard, 15138 SE. Caruthers, Portland, Oreg. 97233

Filed Feb. 9, 1977, Ser. No. 766,331

Int. Cl.[2] F01L *1/18*

U.S. Cl. 123—90.39 **3 Claims**



1. A support platform for mounting internal combustion engine rocker arms of the type carried rotatably on a transverse shaft mounted outwardly of the cylinder head of the engine, the platform comprising;

(a) a base element configured for being positioned on top of the cylinder head,

(b) support pads mounted to the base element, the support pads having transverse bores extending therethrough, which are arranged for receiving the rocker arm shaft, and

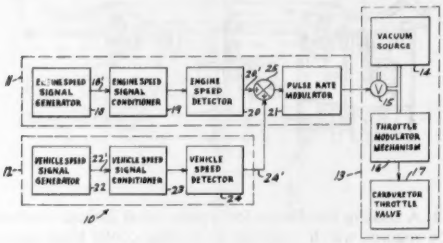
(c) end blocks attached to each end of the base element, the end blocks having transverse bores passing therethrough for engaging the rocker arm shaft, and the end blocks being located on the base element such that they engage the rocker arm shaft outwardly of the outermost rocker arm.

4,086,888

ELECTRONIC VACUUM MODULATOR FOR CONTROLLING AIR FLOW TO A THROTTLE MODULATOR MECHANISM FOR LIMITING ENGINE SPEED AND VEHICLE SPEED

William J. Roberts, Toledo, Ohio, assignor to Eltra Corporation, Toledo, Ohio

Filed Feb. 27, 1976, Ser. No. 662,279
Int. Cl.[2] F02P 9/00
U.S. Cl. 123—102 4 Claims



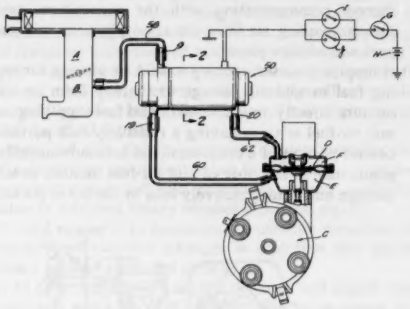
1. Apparatus for limiting the maximum operating speed of an internal combustion engine mounted for driving a vehicle comprising, in combination, means for generating a first electric signal having a frequency corresponding to the speed of the engine, means responsive to such first signal for establishing a second electric signal having a first value when the speed of the engine is below a predetermined narrow high speed range, a second value when the speed of the engine is above the predetermined narrow high speed range and, when the speed of the engine is in the predetermined narrow high speed range, a value between said first and second values and proportional to the engine speed, throttle valve means connected to the engine for progressively reducing the available power of the engine when progressively closed, means responsive to such second signal for progressively closing said throttle valve means as such second signal progressively changes from said first value to said second value, and wherein said means for establishing such second signal includes a capacitor, means for charging said capacitor during each cycle of said first signal for a time proportional to the time of such cycle and for discharging such capacitor durin each cycle for a predetermined fixed time interval, means for comparing the voltage on said capacitor with a reference voltage and having a first output whenever such reference voltage exceeds such capacitor voltage and having a second output whenever such capacitor voltage exceeds such reference voltage, means for applying a reference voltage to said comparing means equal to the maximum capacitor voltage in each cycle when said engine is operated at the maximum speed within the predetermined narrow high speed range whereby said comparing means has a continuous second output whenever the speed of the engine is above the predetermined narrow high speed range, a second capacitor, means responsive to the second output from said comparing means for charging said second capacitor towards said second value, means responsive to the first output from said comparing means for discharging said second capacitor towards said first value, said last-named means discharging said second capacitor to said first value during each cycle of such first signal whenever the speed of the engine is below the predetermined narrow high speed range, and wherein said second signal comprises the voltage across said second capacitor.

4,086,889

ELECTROMAGNETIC SELECTOR VALVE SYSTEM

Touru Yagi, Musashino, and Hiroyuki Osawa, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 29, 1976, Ser. No. 709,799
Claims priority, application Japan, Aug. 5, 1975, 50-107822; Nov. 26, 1975, 50-159259
Int. Cl.[2] F02P 5/04
U.S. Cl. 123—117 A 1 Claim



1. An electromagnetic selector valve spark timing apparatus for an engine comprising, in combination: an electrically conductive coil positioned adjacent a moveable core, said core being adapted to reciprocate between first and second predetermined positions, said coil and core being positioned within a valve body chamber; first, second and third valve passages in communication with said valve body chamber, said first passage being in communication with an engine intake manifold, said second passage being connected to a vacuum chamber for advancing the ignition timing and said third passage being connected to a vacuum chamber for retarding the ignition timing, a diaphragm separating said vacuum chambers being connected to a distributor, biasing means adapted to bias said reciprocative core to assume said first position, said core being adapted to permit communication only between said first and third passages in said first position, said core being adapted to be energized in order to cause said core to assume said second position, said core being adapted to permit communication only between said first and second passage in said second position, first and second valves are positioned at opposite ends of said reciprocative core, and said third and second valve passages are communicated to atmosphere through said first and second valves respectively when each said valve is moved by said reciprocative core to open, a power source is electrically connected to said electrically conductive coil, said source being connected in series electrical relationship with an ignition switch, a normally open high vehicle speed switch and a normally open low engine temperature switch are placed in parallel electrical connection between said power source and said coil.

4,086,890

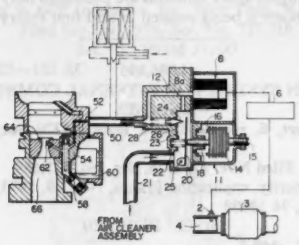
CARBURETOR WITH ALTITUDE COMPENSATION ASSEMBLY

Hidehiro Minami, Yokohama, and Kazuo Abe, Tokyo, both of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Apr. 9, 1976, Ser. No. 675,625
Claims priority, application Japan, Apr. 10, 1975, 50/48814[U]
Int. Cl.[2] F02B 33/00
U.S. Cl. 123—119 EC 5 Claims

1. In a carburetor for use with an electronic closed loop control system for optimally controlling an air-fuel ratio of the air-fuel mixture to an internal combustion engine, which sys-

tem comprises in combination: an air cleaner assembly; a fuel supply tank; an air intake pipe connected to the engine; an exhaust pipe; an exhaust gas sensor provided in said exhaust pipe and generating an electrical signal representing a concentration of a component in exhaust gases; a control unit receiving the signal from said exhaust gas sensor and generating a command signal based on the signal from said exhaust gas sensor; a fuel passage extending between said fuel supply tank and said air intake pipe connected to the engine; an air passage extending between a portion of said fuel passage and said air cleaner assembly; and an actuator provided in said air passage to control the amount of air flowing therethrough into said fuel passage for regulating said air-fuel ratio in response to said command signal,



wherein the improvement comprises,

altitude compensating means provided in said air passage for controlling the amount of air flowing into said fuel passage while a vehicle is operated at higher altitude, which altitude compensating means includes, a bellows inflatable with increase in altitude, first means operatively connected to said bellows responsive to the volume change thereof, an auxiliary air passage bypassing said air passage in such a manner as to terminate at portions of said air passage upstream and downstream of said actuator, and second means provided in said auxiliary air passage and responsive to the volume change of said bellows through said first means to control the amount of air flowing into said fuel passage.

4,086,891

INTAKE SYSTEM FOR INTERNAL COMBUSTION ENGINES, PARTICULARLY FOR INTERNAL COMBUSTION ENGINES OF THE TYPE WHEREIN AN AUXILIARY COMBUSTION CHAMBER IS ASSOCIATED WITH EACH MAIN COMBUSTION CHAMBER AND CONNECTED BY A TORCH NOZZLE

Yoshio Iwasa, Nagareyama, and Yoji Ito, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Apr. 8, 1976, Ser. No. 674,768

Claims priority, application Japan, Apr. 9, 1975, 50-43054

Int. Cl.[2] F02M *31/00*

U.S. Cl. 123—122 AB **8 Claims**

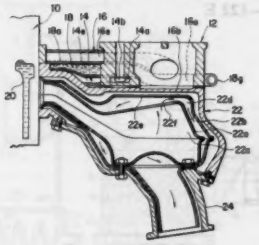
1. In an internal combustion engine

a plurality of cylinders, each having a main combustion chamber, an auxiliary combustion chamber, and a torch nozzle interconnecting said main combustion chamber and said auxiliary combustion chamber;

a main intake manifold means for distributing a large amount of lean air fuel mixture to said main combustion chambers, said main intake manifold means comprising a main heat riser bottom wall and a plurality of main intake pipes, each extending outwardly from said main heat riser toward at least one of said cyliders;

an auxiliary intake manifold means for distributing a small amount of rich air fuel mixture to said auxiliary combustion chambers, said auxiliary intake manifold means comprising an auxiliary heat riser having a bottom wall and a plurality of auxiliary intake pipes, each extending outwardly from said auxiliary heat riser toward at least one of said cylinders;

an exhaust manifold means for conveying hot exhaust gases discharged from said main combustion chambers toward the atmosphere, said exhaust manifold means being in heat conductive contact with said bottom wall of said main heat riser and of said auxiliary heat riser so that said walls are heated with the exhaust gases discharged from said main combustion chambers throughout all operating conditions of said engine;



a cooling liquid jacket communicating with a liquid cooling system of said engine so that cooling liquid flows through said cooling liquid jacket, said cooling liquid jacket in heat conductive contact with said plurality of main intake pipes for heat transfer between the cooling liquid and the lean air fuel mixture in said plurality of main intake pipes, and also with said plurality of auxiliary intake pipes for heat transfer between the cooling liquid and the rich air fuel mixture in said plurality of auxiliary intake pipes.

4,086,892

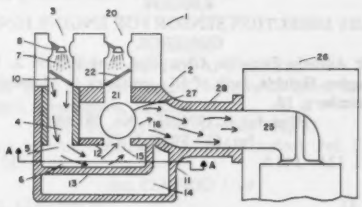
FUEL INDUCTION SYSTEM

Frederick J. Marsee, Clawson, Mich., assignor to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 508,087, Sep. 23, 1974, Pat. No. 3,972,324, and Ser. No. 498,960, Aug. 20, 1974, Pat. No. 3,971,352, which is a continuation-in-part of Ser. No. 439,912, Feb. 6, 1974, abandoned. This application Jun. 4, 1976, Ser. No. 692,734

Int. Cl.[2] F02M *31/00*

U.S. Cl. 123—122 AC **5 Claims**



1. A fuel induction system for a spark-ignited multicylinder internal combustion engine, said system comprising in combination carburetor means, a mixing chamber defined by a non-perforate bottom wall and non-perforate side walls and a top wall and intake manifold means, said carburetor means having at least one primary barrel in which gasoline is inducted into air to form a primary air/fuel mixture, said primary barrel being operatively connected to an inlet in said top wall of said mixing chamber, said manifold means comprising two sets of intake runners, each of said sets being adapted to deliver an air/fuel mixture to a different one-half of said multicylinders, said mixing chamber having two outlets in said top wall, each of said outlets being operatively connected to a different one of said two sets of intake runners, whereby each of said two sets

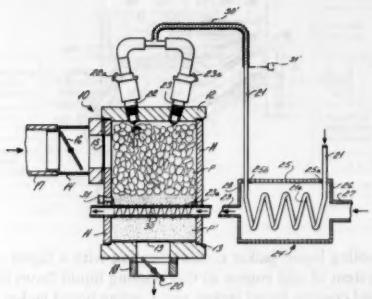
of intake runners receives an air/fuel mixture from a common mixing chamber which mixture has been thoroughly mixed by the turbulence caused by reversal in direction of flow in said mixing chamber.

4,086,893

CARBURETOR

Gunther Bernecker, Montvale, N.J., assignor to Donald B. Conlin, Mahwah, N.J., a part interest

Filed Feb. 22, 1977, Ser. No. 770,964
Int. Cl.[2] F02M *31/00*
U.S. Cl. 123—122 E **12 Claims**



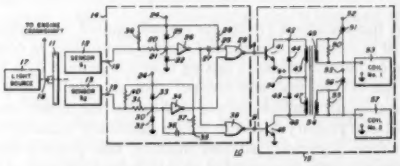
1. A carburetor for supplying a fuel/air mixture to an internal combustion engine having an intake manifold comprising a housing, contained in the housing only matter which is inert relative to the fuel, said matter being porous, means for injecting at least partially liquid fuel into the housing and onto said porous matter, means for heating all the fuel which is injected into the housing sufficiently before the fuel leaves the housing so that all the fuel is completely vaporized when it leaves the housing, means for admitting air into the housing simultaneously with the injection of the fuel to form a mixture with all the vaporized fuel in the housing and means for connecting the housing directly to the intake manifold of an internal combustion engine and for conducting the entire mixture out of the housing directly to the intake manifold during all phases of operation of the engine for combustion in the internal combustion engine.

4,086,894

ROTARY DIRECTION SENSOR FOR ENGINE IGNITION CONTROL

Zbynek Antonin Capurka, Glen Elyn, and Robert J. Vargas, Arlington Heights, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 6, 1976, Ser. No. 702,656
Int. Cl.[2] F02P *11/00*
U.S. Cl. 123—148 S **13 Claims**



1. An engine spark ignition system having a rotation sensor for controlling the creation of spark ignitions, comprising:

rotary body means synchronously rotatable by an engine crankshaft about an axis;

at least a first and second sensor means each producing a separate sensor signal having logic states directly corresponding to the rotational positions of said rotary body, said logic states having transitions therebetween;

logic circuitry means coupled to said first and second sensors for receiving said first and second sensor signals and producing a control signal with transitions which indicates that said rotary body is being rotated in a first rotary direction, wherein each coincidence of a predetermined logic state of said first sensor signal with transitions of only a predetermined polarity of said second sensor signal produces transitions in said control signal; and

means coupled to said logic circuitry means for receiving said control signal and producing spark ignitions for said engine in response to the production of said control signal transitions by said predetermined polarity transitions of said second sensor signal,

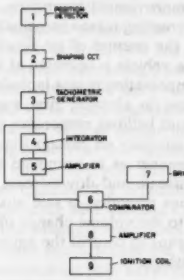
wherein engine spark ignitions are produced only when said rotary body is being rotated in said first rotary direction.

4,086,895

IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Roger Habert, 6, rue du Faisan Dore, 94370 Sucy en Brie, France

Filed Nov. 27, 1974, Ser. No. 527,689
Claims priority, application France, Nov. 29, 1973, 73 42543; Jul. 9, 1974, 74 23808
Int. Cl.[2] F02P *5/04*
U.S. Cl. 123—148 E **9 Claims**



1. An ignition dwell control system for an internal combustion engine comprising in combination,

an engine driven rotary position detector,

a signal shaping circuit connected to said detector and adapted to emit pulses at a frequency proportional to the rotary speed of said detector,

a tachometric generator connected to said signal shaping circuit and incorporating a current source adapted to draw current at a rate proportional to the frequency of the pulses emitted from said signal shaping circuit,

a resistor and an integrating capacitor connected in series with said current source,

means actuated in response to the pulses emitted from said signal shaping circuit for periodically resetting said capacitor when said position detector is at a reference position so that the voltage U1 across the capacitor is proportional to the angular displacement of the detector from the reference position, and the voltage U2 across the resistor is proportional to the rotary speed of the detector,

a source of threshold voltage U3,

a comparator connected to said resistor and integrating capacitor and to said source of threshold voltage, adapted to compare the sum of the position and speed voltages U1 and U2 with the threshold voltage U3 and to produce an output signal when the voltage sum exceeds the threshold voltage,

an ignition coil connected to said comparator,

and an amplifier interposed between the comparator and the ignition coil and being adapted to allow current to flow

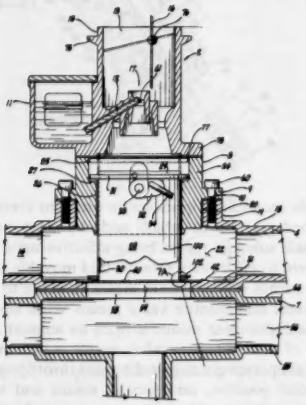
through the ignition coil when the comparator produces an output, said coil being adapted to produce an ignition spark output when the comparator ceases to produce an output.

4,086,896

THROTTLE STRUCTURE FOR IMPARTING SUPERSONIC CHARACTERISTICS IN THE INTAKE MANIFOLD OF AN INTERNAL COMBUSTION ENGINE

Donald L. Hicks, and Richard D. Doerr, both of St. Louis, Mo., assignors to ACF Industries, Inc., New York, N.Y.

Filed Sep. 29, 1976, Ser. No. 727,718
Int. Cl.[2] F02M *31/00*
U.S. Cl. 123—122 AC 12 Claims



1. A fuel supply system for an internal combustion engine, comprising:

an intake manifold for distributing a fluid to the engine, said intake manifold having an enclosure, said enclosure including at least one wall defining a fluid passage in said manifold;

a carburetor for supplying a fuel/air mixture to said intake manifold, said carburetor having an air passage in it operatively connected to said intake manifold, fuel supply means connected to said air passage, and means for mixing fuel and air in said air passage upstream of said intake manifold; and

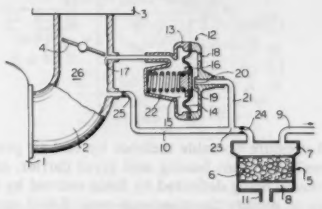
throttle valve means for controlling the fluid flow through said intake manifold mounted in said intake manifold, said throttle valve means comprising a tubular element movable between at least a first position and a second position in said intake manifold, said tubular element having a side wall, said side wall having a material thickness, said side wall further delimiting an opening connecting the intake manifold and the air passage, said tubular element having a first end in said carburetor, and a second end in said intake manifold, the material thickness of said side wall having a chamfer formed in it along the second end of the tubular element, and a lip extending outwardly from the second end of said tubular element, said lip having an annular upper wall and an angled lower wall, the chamfer along said material thickness and said lower angled wall defining a convergence, a point of maximum convergence, and a diverging section for fluid flow in said intake manifold.

4,086,897

EVAPORATED FUEL FEED CONTROL DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Tetsuomi Tamura, Toyota; Koichi Mizutani, Seto, and Toshiharu Matsuura, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Apr. 7, 1977, Ser. No. 785,673
Claims priority, application Japan, Dec. 28, 1976, 51-157561
Int. Cl.[2] F02M *39/00, 23/04*
U.S. Cl. 123—136 3 Claims



1. A device for controlling the feeding of the evaporated fuel of an internal combustion engine which is provided with an intake passage having a throttle valve therein, said device comprising:

a charcoal canister for absorbing the evaporated fuel therein;

a passage means communicating said canister with said intake passage downstream of said throttle valve for feeding the evaporated fuel into said intake passage;

a vacuum port opening into said intake passage at a position downstream of said throttle valve when said throttle valve is in the closed position, and opening into said intake passage at a position upstream of said throttle valve when the throttle valve is opened, and;

a means for stopping the feeding operation of the evaporated fuel in repsonse to a change in the vacuum level in said vacuum port when the vacuum level in said vacuum port is increased beyond a predetermined vacuum level which is greater than the level of the vacuum produced in said intake passage at the time of idling the engine, said stopping means comprising a valve device establishing a fluid connection between said passage means and the atmosphere for feeding bleed air into said passage means when the vacuum level in said vacuum port is increased beyond said predetermined vacuum level.

4,086,898

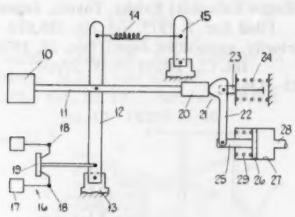
FUEL PUMPING APPARATUS

Miroslav Kriz, London, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Jun. 30, 1976, Ser. No. 701,022
Claims priority, application United Kingdom, Jul. 5, 1975, 28434/75
Int. Cl.[2] F02D *1/04*
U.S. Cl. 123—140 MP 11 Claims

1. A fuel pumping apparatus for supplying fuel to a supercharged compression ignition engine the apparatus comprising an injection pump including a control member movable axially to vary the rate of fuel supply to the engine, governor means including an operator adjustable member, speed responsive means and a governor spring for determining the setting of the control member and the apparatus further comprising a housing, a stop member movably mounted in a wall of the housing said stop member being positioned to be engaged by said control member to determine the maximim rate of fuel supply by the apparatus, a pivot carrier mounted in the housing, said pivot carrier being movable in the direction of movement of said stop member, a lever pivotally mounted on said pivot carrier, one end of said lever defining a cam surface engageable with said stop member to determine the position thereof, a

fluid pressure operable member connected to the other end of said lever, means whereby in use, said member can be subjected to the pressure of air in the air inlet manifold of the associated engine, first resilient means opposing movement of



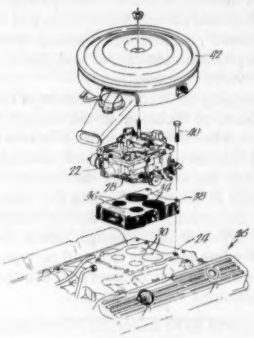
said fluid pressure operable member by said air pressure, and second resilient means biasing said pivot carrier, said second resilient means being deflected by force exerted by the governor spring to modify the maximum rate of fuel supply under certain operating conditions of the engine.

4,086,899

AIR FUEL INLET DEVICE FOR INTERNAL COMBUSTION ENGINES

James K. Gaylord, 419 Sheridan Rd., Winnetka, Ill. 60093

Filed Aug. 9, 1976, Ser. No. 712,654
Int. Cl.[2] F02M *29/00*
U.S. Cl. 123—141 **15 Claims**



2. In a device for use in a fuel supply system, a spacer insertable in the supply system and having a passage therethrough for transmission of the fuel, the surface of said passage having a plurality of recesses therein, said spacer being of a thickness to maintain a passage length of substantially one inch in said supply system.

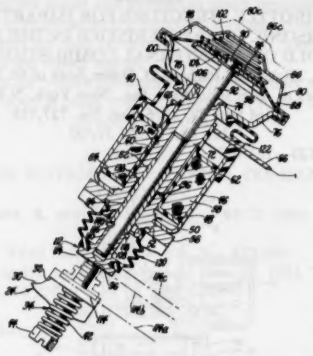
4,086,900

VARIABLE POSITION THROTTLE STOP AND DASHPOT APPARATUS

Keith D. Marsh, St. Clair Shores, Mich., assignor to Colt Industries Operating Corporation, New York, N.Y.

Filed Jul. 19, 1976, Ser. No. 706,812
Int. Cl.[2] F02B *77/00*
U.S. Cl. 123—198 D **9 Claims**

1. Apparatus for variably stopping the closing movement of throttle valve means controlling the flow motive fluid to an associated engine, comprising variably positionable abutment means effective for operative engagement with said throttle valve means when said throttle valve means is moved toward a closed position, first means for moving said abutment means to a first position whereat said throttle valve means when moved toward said closed position operatively engages said abutment means to thereby move said abutment means from said first position to a second position whereat said throttle valve means is opened an amount less than the opening of said throttle valve when said abutment means was operatively engaged by said throttle valve means in said first position, and second means for inhibiting the rate of movement of said abutment means from said first position to said second position, said first means comprising resilient means and solenoid means, said resilient means being effective to urge said abutment means toward said first position, said solenoid means being effective



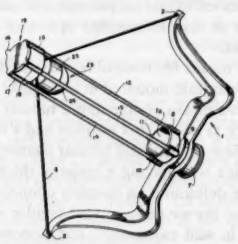
to provide movable stop means in order to thereby establish said second position to which said abutment means may be moved, said solenoid means being effective upon de-energization thereof to effectively remove said movable stop means in order to permit said abutment means to move to a third position whereat said throttle valve means when operatively engaging said abutment means is open an amount less than the opening of said throttle valve means when said abutment means was operatively engaged by said throttle valve means in said second position, said second means and said solenoid means being displaceable with respect to each other.

4,086,901

MISSILE PROPELLING DEVICE AND MISSILE THEREFOR

Joseph J. Clement, 1220 Denarvaez Ave., Bradenton, Fla. 33505

Filed Sep. 20, 1976, Ser. No. 724,777
Int. Cl.[2] F41B *7/00*
U.S. Cl. 124—21 **9 Claims**



1. A missile propelling device comprising a rigid bow, an ejection tube forming a part of said bow and disposed intermediate the ends thereof and arranged to receive and guide a missile in a direction transverse to said bow, a plurality of parallel guide rods whose corresponding ends are secured about the periphery of said ejection tube to define an elongated missile guiding passage whose axis is aligned with the axis of said ejection tube, a pair of diametrically opposite guide rods

being arranged with their axes in the plane of said bow and said string being disposed therebetween to position the midportion thereof diametrically of said missile guiding passage, an elastic string attached to the ends of said bow and having its midportion disposed between preselected guide rods and astride said missile guiding passage, an end cap secured to the ends of said guide rods remote from said ejection tube, and hook means mounted on said end cap and arranged releasably to engage the midportion of said string, said string being engageable with a missile disposed in said missile guiding passage.

4,086,902

TOY PROJECTILE LAUNCHING APPARATUSES

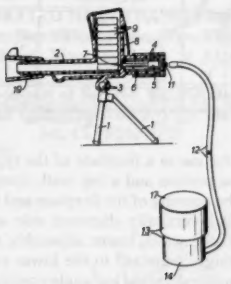
John Dudley Reynolds, New Malden, England, assignor to Lesney Products & Co. Limited, London, England

Filed Apr. 11, 1977, Ser. No. 786,619

Claims priority, application United Kingdom, Apr. 13, 1976, 15148/76

Int. Cl.[2] F41F *1/04*

U.S. Cl. 124—61 **15 Claims**



1. A rapid fire toy projectile launching apparatus, comprising:

pneumatically displaceable means for moving from an initial position toward a projectile, appropriately disposed for launching upon being struck by said pneumatically displaceable means, when a positive pneumatic pressure is supplied thereto and for returning to the initial position thereof when a negative pneumatic pressure is supplied thereto;

support means for causing a projectile to be disposed, relative to the initial position of said pneumatically displaceable means, in a launchable position at which the projectile will be struck by said pneumatically displaceable means upon pneumatic displacement from the initial position thereof; and

operating means, in pneumatic connection with said pneumatically displaceable means, for supplying positive pressure to said pneumatically displaceable means for forward movement thereof and for supplying negative pressure thereto for return movement thereof, said operating means comprising

a variable volume chamber which is substantially sealed other than a pneumatic connection to said pneumatically displaceable means; and

biasing means for maintaining said chamber at an initial volume thereof and for rapidly restoring the initial volume of said chamber after any sudden reduction in the volume thereof,

whereby a sudden reduction in the volume of said chamber causes positive pressure to be supplied to said pneumatically displaceable means and the rapid return of said chamber to the initial volume thereof by means of said biasing means causes negative pressure to be supplied to said pneumatically displaceable means.

4,086,903

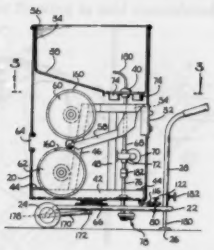
TENNIS BALL THROWING MACHINE

Jack C. Scott, 8547 Amestoy Ave., Northridge, Calif. 91324

Filed Apr. 13, 1976, Ser. No. 676,410

Int. Cl.[2] A63B *69/40*

U.S. Cl. 124—78 **11 Claims**



10. A tennis ball throwing machine comprising:

a lower frame assembly;

an upper frame assembly;

a bearing means between said upper and said lower frame assemblies for allowing relative oscillation therebetween about an approximately vertical axis;

first and second independentally controllable variable speed motors disposed one above the other on said upper frame assembly, said motors being disposed each with its shaft axis approximately in a horizontal disposition,

first and second impeller wheels, each mounted on the shaft of one of said first and second motors, said first and second impeller wheels being substantially coplanar and having a closest separation somewhat less than the diameter of a tennis ball;

a receptacle for a supply of tennis balls generally disposed at the top of and coupled to said upper frame assembly;

delivery means driven by a third motor for periodically delivering tennis balls from said receptacle to a position adjacent said point of closest separation of said impeller wheels;

oscillating means driven by said third motor synchronized with said delivery means for oscillating said upper frame assembly with respect to said lower frame assembly through a predetermined angle and at a frequency which is one-half the frequency of said delivery means; and

wherein the controls for said first, second and third motors are located remotely and coupled to said machine through a cable, said delivery means being independent on the direction of rotation of said third motor, said controls for said third motor including a control for reversing said third motor, said oscillating means being driven by said third motor through a unidirectional clutch, whereby reversal of said third motor will stop said oscillation and not said delivery means.

4,086,904

BOW STRING ATTACHED HAND RELEASE ANCHOR

Michael D. Suski, P.O. Box 201, Flushing, Mich. 48433 and Michael R. Suski, 313 Elms Rd., Flushing, Mich. 48433

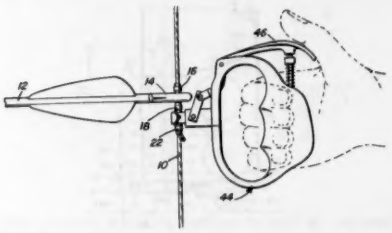
Filed Nov. 10, 1976, Ser. No. 740,717

Int. Cl.[2] F41B *5/00*

U.S. Cl. 124—90 **7 Claims**

1. In combination, a bow string release anchor and a bow string; said string including a location thereon closely adjacent an arrow nocking point on said string, said release anchor comprising a generally elongated horizontal body having front and rear end portions and upper and lower longitudinal surfaces extending between said front and rear end portions, said rear end portion of said body including a recessed anchor means adapted to be engaged and releasably gripped by a hand-held release device, said front end portion of said body

including an upstanding bore formed therethrough opening upwardly and downwardly through said upper and lower longitudinal surfaces, respectively, said bore receiving said bow string, at said location, therethrough, said body including an upstanding bow string entrance and exit slot for said upstanding bore formed therethrough extending longitudinally of



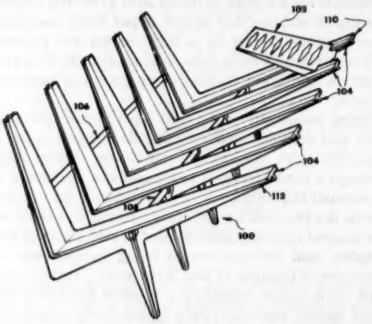
said body opening upwardly and downwardly through said upper and lower longitudinal surfaces and through which said string may pass for lateral movement into and out of said bore, the forward end of said slot opening into said bore throughout the length thereof and the rear end of said slot opening outwardly through the rear end of said body.

4,086,905

COMBINATION FIRE GRATE AND FIREPLACE COOKING APPARATUS

Robert E. Dawson, 2445 Edge Hill Rd., Huntingdon Valley, Pa. 19006

Filed Jan. 7, 1976, Ser. No. 647,193
Int. Cl.[2] F47J *37/06;* **F24B** *3/00, 1/26;* **F23H** *13/00*
U.S. Cl. 126—25 A **25 Claims**



1. A self-stoking fireplace cooking apparatus for use with any of a variety of sizes of solid fossil fuels comprising:

(a) a plurality of distinct grate members, each of which members comprises an upstanding retainer section, a fuel feeding section transversely disposed with respect to said upstanding retainer section, and a supporting section attached to said fuel feeding section along an axis substantially parallel to the axis of said upstanding retainer section;

(b) compression means piercing each of said grate members along an axis substantially perpendicular to the plane of said grate members for aligning said grate members axially with respect to each other and for forcing at least two of said grate members towards each other along the axis of said axial alignment;

(c) spacing means disposed between said grate members around said compression means for retaining said grate members at a preselected parallel spaced apart position with respect to each other, and for transferring said compressive force applied by said compression means from said two of said grate members to the remainder of said grate members to thereby rigidly interconnect said grate members in said axially aligned position; and

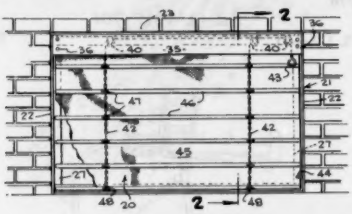
(d) a cooking grill having a substantially planar cooking surface disposed thereon, and wherein said fuel feeding sections further comprise track means for allowing axial movement of said cooking grill, said cooking grill being capable of slidably engaging said track means for movement substantially along the axis of said fuel feeding section.

4,086,906

FIREPLACE SHIELD

Martin Reichgut, 33 Highland Rd., Westport, Conn. 06880

Filed Apr. 27, 1976, Ser. No. 680,698
Int. Cl.[2] F23M *7/00*
U.S. Cl. 126—140 **3 Claims**



1. Apparatus for use in a fireplace of the type that includes side walls, a base portion and a top wall, comprising a frame located within the opening of the fireplace and including a pair of spaced parallel vertically disposed side angles mounted adjacent to said side walls, lower adjustable screw threaded compression fittings connected to the lower ends of said side angles, a horizontally disposed top angle positioned adjacent to said top wall and extending between the upper ends of said side angles and secured thereto, a horizontally disposed support angle mounted below said top angle and proximate thereto, a horizontally disposed bottom angle extending between the lower ends of said side angles and secured thereto, upper adjustable screw threaded compression fittings connected to the ends of said top angle, a plurality of rollers connected to said support angle, chains trained over said rollers, a finger-engaging piece connected to said chains, a keeper connected to the lower portion of one of said angles for selective engagement by said finger piece, a foldable fire resistant screen which substantially prevents the flow of air therethrough connected to said support angle, said screen having a plurality of horizontally disposed reinforcing rods connected thereto, said screen and said reinforcing rods overlying said side angles and said bottom angle to substantially close the fireplace opening, guide members connected to said rods and having said chains extended therethrough, and the lower ends of said chains being secured to the lower portions of said screen.

4,086,907

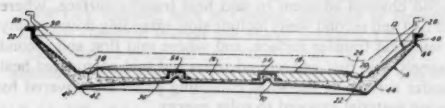
HEAT STORAGE DISH

Henry H. Rothschild, Cherry Hill, N.J., assignor to Caddy Corporation of America, Pitman, N.J.

Filed Sep. 8, 1976, Ser. No. 721,527
Int. Cl.[2] A47G *23/04*
U.S. Cl. 126—246 **13 Claims**

1. A heat storage dish comprising upper and lower dish walls having a generally complementary peripheral configuration, said walls being secured together at their peripheries with the remainder of the walls being spaced from each other to define a cavity therebetween, a heat storage plate positioned in said cavity between said walls, said plate having at least two elongated generally rectangular openings formed therein; means respectively associated with said openings and secured to said upper wall and extending through said openings for supporting

said plate against said upper wall, said means each comprising an inverted U-shaped channel having a base and a pair of spaced leg portions, said base being secured to said upper wall and said legs extending downwardly therefrom through their associated openings; said legs having lower ends, including a



pair of oppositely directed flanges extending outwardly from said legs below said plate and on which said dish is supported; and heat insulating material positioned in said cavity between said plate and said bottom wall extending entirely across said plate and beneath said channels to resist heat transfer from the plate through said bottom wall.

4,086,908

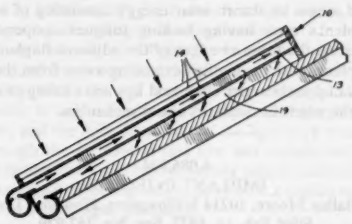
PERFORATED HEAT TRANSFER SHEET

Frank D. Werner, Box SR9, Jackson, Wyo. 83001, and Richard C. Greig, Jackson, Wyo., assignors to Frank D. Werner, Jackson, Wyo.

Continuation-in-part of Ser. No. 590,052, Jun. 25, 1975, abandoned. This application Jun. 9, 1976, Ser. No. 694,338

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—270 **12 Claims**



1. A solar heat collector assembly including a sheet of heat transfer material, radiant energy transmitting, cover means on one side of the sheet of material and spaced therefrom, means to support the cover means relative to said sheet of material to form a first chamber extending along a first side of said sheet of material, means forming a second chamber on a second side of said sheet opposite from the first chamber, said sheet of material being in the range of 0.001 to 0.015 inches thick and having apertures therethrough, no greater than 0.025 inches in smallest dimension, said apertures being spaced apart and providing passage of air from the first chamber to the second chamber, means to cause a forced airflow from said first to said second chambers, said apertures being spaced in said sheet of material so that a desired rate of forced airflow causes a sufficient pressure drop across said sheet of material to substantially suppress free convection.

4,086,909

AIR-HEATING SOLAR COLLECTOR

Floyd A. Lyon, Brookville, and Henry Harrison, Locust Valley, both of N.Y., assignors to Halm Instrument Co., Inc., Glen Head, N.Y.

Filed Jul. 15, 1976, Ser. No. 705,669

Int. Cl.[2] F24J *3/02*

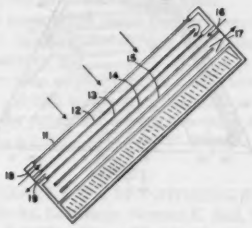
U.S. Cl. 126—270 **2 Claims**

1. An air-heating solar collector comprising,

a plurality of parallel, spaced-apart, substantially coextensive translucent sheets forming a convoluted air passage passing in succession between successive pairs of said sheets,

a blackened absorber plate mounted parallel to and spaced below said sheets so that the air passes the blackened absorber plate on both sides,

whereby heat escaping from said absorber to said sheets is picked up by air flowing in said convoluted air passage,



said convoluted air passage having a primary air flow portion which passes over said absorber plate and has an inlet and an outlet, and a separate secondary air flow portion on top of said primary air flow portion which has a separate inlet and a separate outlet.

4,086,910

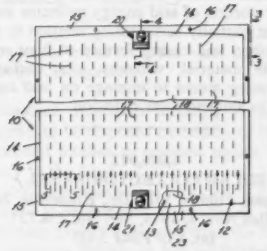
SOLAR ABSORBER PANEL

Robert S. Rowland, Lansing, Mich., assignor to Tranter, Inc., Lansing, Mich.

Filed Apr. 14, 1976, Ser. No. 677,055

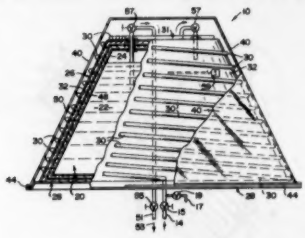
Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—271 **2 Claims**



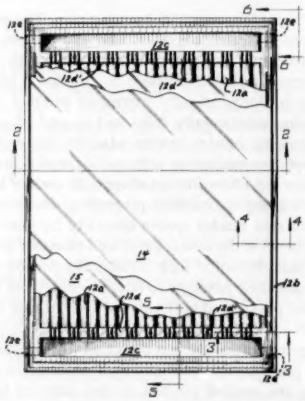
1. A solar heat absorber panel having a pair of superimposed sheets marginally sealed together, said sheets being secured together inwardly of said sealed margin thereof by longitudinally interrupted weld connections to provide a plurality of laterally spaced longitudinally extending internal flow passages extending substantially from end to end of said panel, laterally extending header spaces adjacent the ends of said panel in direct communication with said internal flow passages, inlet and outlet fluid flow fittings at opposite ends of said panel, each fitting having a chamber projecting above said panel across one of said header spaces centrally between opposite sides of said panel at the outer side of said chamber and tapered at the inner side thereof to form a restricted portion extending into one of said flow passages to laterally distribute fluid flow to the internal passages at both sides of said fittings, the header space at each end of said panel sloping from the central portion thereof laterally outwardly in a direction toward the opposite end of said panel so that said passages decrease uniformly in length from the central portion to the sides of said panel, thereby to improve drainage and to provide for a more even distribution of fluid flow through said passages.

4,086,911
SOLAR HEATING DEVICE
Wilbur O. Hatch, P.O. Box 947, Brandon, Fla. 33511
Filed Apr. 28, 1976, Ser. No. 681,196
Int. Cl.[2] F24J 3/02; F24H 7/00
U.S. Cl. 126—271 **7 Claims**



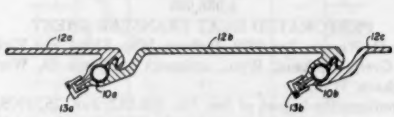
1. A fluid heating system of the type utilizing solar energy as a heating source, said heating system comprising: an energy collecter assembly having a frustoconical configuration and including fluid storage means configured to have fluid stored on the interior thereof; said energy collector assembly further comprising an exterior portion, a collector unit mounted on said exterior portion in substantially segregated and insulated relation to said fluid storage means, said collector unit comprising coil means disposed on the exterior surface of said exterior portion and defining at least in part a substantially continuous path of fluid flow from a fluid supply to said fluid storage means, said collector unit being in at least partial surrounding relationship relative to said fluid storage means; said energy collector assembly including a base portion and a head portion, said exterior portion and said collector unit disposed thereon in angular orientation between said base portion and said head portion and at least partially defining a predetermined configuration, casing means substantially correspondingly configured to said exterior portion of said energy collector assembly disposed in at least partially surrounding relation to said energy collector assembly, said casing formed at least in part from light permeable material, whereby solar radiation passes through said casing means to impinge on said collector unit when exposed to ambient solar radiation.

4,086,912
SOLAR COLLECTOR PANEL
John M. Freeman, 1106 N. Villa Dr., Evansville, Ind. 47711
Filed Nov. 4, 1976, Ser. No. 738,727
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—271 **2 Claims**



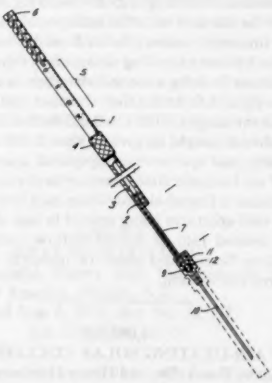
1. A solar collector panel comprising, in a one-piece molded relationship, a base having a corrugated heat transfer surface, a first channel disposed at one end of said heat transfer surface for receiving a heat transfer liquid, a first weir forming a wall of said first channel adjacent to said heat transfer surface, a second channel disposed at an opposite end of said corrugated heat transfer surface, and a second weir forming a wall of said second channel adjacent to said heat transfer surface, where said first and second weirs include slots extending downwardly to said heat transfer surface, and where said first and second channels, said first and second weirs and said corrugated heat transfer surface of the solar collecting panel are covered by glazing material exposed to solar energy.

4,086,913
SOLAR HEAT COLLECTOR CONSTRUCTION
Joseph G. Gavin, Huntington, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.
Filed Dec. 15, 1976, Ser. No. 750,580
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—271 **2 Claims**



1. A solar collector comprising:
fluid conduit means including a plurality of tubes; and
means to absorb solar energy and transfer same to said tubes, said means to absorb solar energy consisting of adjacent finplanks each having locking tongues cooperating to encircle the tubes at edges of the adjacent finplanks, said finplanks also having lips extending away from the tubes, and clip means encircling said lips and closing said edges of the adjacent finplanks about said tubes.

4,086,914
IMPLANT INJECTOR
Edwin Bailey Moore, 10214 Willowgrove, Houston, Tex. 77035
Filed Feb. 11, 1977, Ser. No. 767,979
Int. Cl.[2] A61N 5/00
U.S. Cl. 128—1.2 **4 Claims**



1. In an implant injector having inner and outer members, said inner member having an axial passageway therethrough, a plunger on the outer member adapted to pass through said axial passageway of the inner member, a continuous channel in the surface of one of said members, divided into spaced, connecting semi-circular steps, means mounted in the other member adapted to be received and to travel in said channel as the

plunger is moved through the inner member against implants therein.

4,086,915

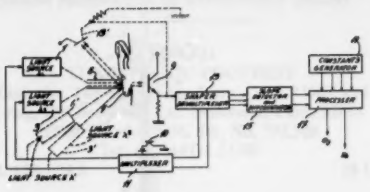
EAR OXIMETRY PROCESS AND APPARATUS

Harvey I. Kofsky, 3250 Ellendale, Montreal, Quebec, and Glenfield Warner, 3010 Matis St., Ville St. Laurent, Montreal H4R 1A3, Quebec, both of Canada, assignors to Harvey I. Kofsky; Glenfield Warner and Harry Schwartz, Canada

Continuation-in-part of Ser. No. 573,106, Apr. 30, 1975, abandoned. This application May 24, 1976, Ser. No. 689,509

Int. Cl.[2] A61B *5/00*

U.S. Cl. 128—2 L **21 Claims**



1. A process for determining the value of oxygen saturation of the blood of a subject, comprising:

mounting an earpiece on the ear lobe of the subject, said earpiece comprising light directing means and light intensity detecting means and being arranged such that the light directing means is on one side of said ear lobe and the light detecting means is on the other side of said ear lobe;

directing a first ray of light, from a first light source, at a first frequency at said light directing means;

directing a second ray of light, from a second light source, at a second frequency at said light directing means;

whereby said rays are directed, by said light directing means, to said ear lobe and transmitted through said ear lobe, and the light intensities of the light rays transmitted through the ear lobe at said first and second frequencies are detected, by said light detecting means, and converted, in said light detecting means, to electrical signals representative of said light intensities;

differentiating, with a differentiating means, said electrical signals representative of said light intensities of said first and second frequencies respectively;

providing said differentiated signals to a processor means, said processor means comprising a set of predetermined coefficients;

and processing, in said processor means, said differentiated signals in association with said predetermined coefficients to obtain said value of oxygen saturation.

4,086,916

CARDIAC MONITOR WRISTWATCH

Henry J. Freeman, Miami Beach, and John M. Dinwiddie, Tamarac, both of Fla., assignors to Joseph J. Cayre, New York, N.Y.

Filed Sep. 19, 1975, Ser. No. 614,898

Int. Cl.[2] A61B *5/02*

U.S. Cl. 128—2.05 T **37 Claims**

1. In an electronic wristwatch which includes a face portion having timing circuitry mounted therein which includes a digital readout of time, and a wrist strap portion for securing said face portion about the wrist of the wearer, a cardiac monitoring improvement thereto which comprises:

means mounted in said wrist strap portion for transmitting a signal towards the radial artery of the wearer and means mounted in said wrist strap portion for receiving the signal reflected therefrom;

means mounted in said wrist strap portion which is responsive to said transmitted and received signals for producing an analog signal proportional to the relative movement of said artery;

means mounted in said face portion for converting said analog signal to a digital signal indicative of the pulse rate of the wearer; and

means connected to said timing circuitry of said electronic wristwatch for selectively displaying said pulse rate on said digital readout;

wherein said transmitting means and said receiving means each comprise an ultrasonic transducer;

wherein said transmitting means further comprises a crystal-controlled oscillator for driving the transmitting ultrasonic transducer; and

further comprising amplifier means connected between said oscillator and said transmitting ultrasonic transducer for matching the respective impedances thereof.

4,086,917

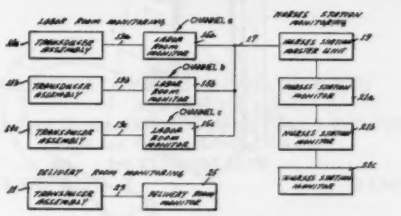
FETAL HEART RATE MONITORING SYSTEM

Nathaniel W. Burks, San Diego; Newton E. Ball, Solana Beach, and David L. Britt, San Diego, all of Calif., assignors to Medical Instruments & Technology Corp., San Diego, Calif.

Continuation of Ser. No. 449,251, Mar. 8, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,275

Int. Cl.[2] A61B *5/02*

U.S. Cl. 128—2.05 T **13 Claims**



13. Apparatus for monitoring the heart rate of a fetus in an expectant mother, comprising:

a housing;

a first ultrasonic transducer included in the housing and constructed to be disposed externally of the abdomen of the expectant mother to transmit signals at a particular frequency to the fetus;

a second ultrasonic transducer included in the housing and constructed to be disposed externally on the abdomen of the expectant mother to receive from the fetus the signals at the particular frequency but modulated by the heart rate of the fetus;

an ultrasonic transducer assembly, including the first and second transducers, constructed to provide for the transmission of the signals at the particular frequency to the fetus and to receive the modulated signals from the fetus;

the transducer assembly including means included in the housing for matching the impedance of the first transducer to the impedance of the abdomen of the expectant mother and means for matching the impedance of the second transducer to the impedance of the abdomen of the expectant mother;

monitor means responsive to the modulated characteristics of the received signal to detect such modulations for the production of indications representing the heart rate of the fetus, the monitor means including means for passing the modulations and rejecting artifact noise;

coupling means releasably connecting the transducer assembly with the monitor means to introduce the modulated signals to the monitor means;

means for providing a carrier signal having a particular frequency;

means for modulating the carrier signals with the signals

passing through the monitor means and for transmitting the signals to a distant position;

means at the distant position for demodulating the signals transmitted to the distant position;

means responsive to a change in the disposition of the transducer assembly means to a position removed from the heart of the fetus for providing for at least a particular period of time a signal having a frequency representing the last rate of the heart beat of the fetus before such change in disposition; and

means responsive to a restoration of the transducer assembly means on the abdomen of the expectant mother for restoring the signal having the last rate of the heart beat.

4,086,918

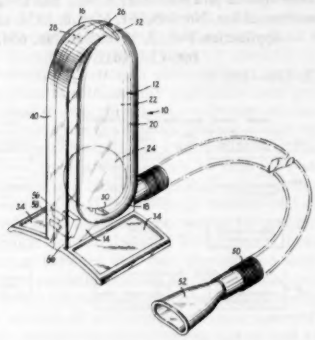
INHALATION DEVICE

Ronald D. Russo, Hamden, Conn., assignor to Chesebrough-Pond's Inc., Greenwich, Conn.

Filed Feb. 11, 1976, Ser. No. 657,241

Int. Cl.[2] A63B *23/00*

U.S. Cl. 128—2.08 **15 Claims**



1. A self-supporting incentive inhalation device for inducing respiratory exercises comprising:

a container having a front and back portion, a top wall and a non-perforated bottom wall and an intermediate see-through wall forming a chamber within said container which extends between said top and bottom walls,

a light-weight article in said chamber normally at the bottom thereof, but which, upon inhalation by the user at a precalibrated flow rate, will rise towards the top thereof,

opposing openings extending through the upper portion of said container and into said chamber wherein through one of said openings air flows from the chamber upon inhalation, and wherein the opposing opening connects the chamber to atmosphere which flows into and through the chamber and said one opening for lifting said article upon inhalation,

an inhalation passageway integral with said device wherein said passageway extends from the front and bottom of said container and up along the back of said container and said passageway being formed by the surface of said walls adjacent said passageway and a channel integral therewith, and, where at its upper end, said passageway is connected to said one opening, and

means connected to said passageway at the front and bottom of said container to allow a person to withdraw air from said chamber to cause a flow of air into the chamber through said opening connected to atmosphere through the chamber and into said opposing opening and passageway which causes said article therein to rise to and be maintained at the top of said chamber when the user reaches and maintains an inhalation effort which is at least at the precalibrated flow rate,

said passageway and last said means leaving a clear view of said chamber within said container so that said article in said chamber easily can be seen and followed by the user.

4,086,919

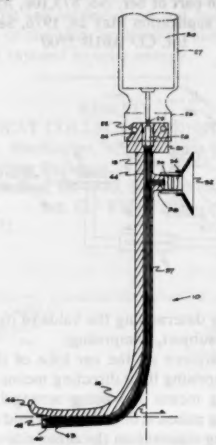
LARYNGOSCOPE

James R. Bullard, 6 Sayle Rd., Charleston, S.C. 29401

Filed Jul. 9, 1976, Ser. No. 703,839

Int. Cl.[2] A61B *1/06*

U.S. Cl. 128—11 **9 Claims**



1. An improved laryngoscope for use in indirect visualization of the glottis without disturbing the normal position of the head of a human in supine position, comprising a rigid elongate blade having a width greater than its thickness and a longitudinal axis between proximal and distal end portions generally conforming in curvature to the longitudinal curvature of the passageway from the entrance of the oral cavity to the epiglottis of the normal human anatomy, the longitudinal axis of the blade at the distal end portion defining an acute angle of between 80° and 100° with the longitudinal axis of the blade at the proximal end portion, and means extending along the blade for transmitting light into an area beyond the distal end of the blade and for transmitting visual images from said area to a position adjacent the proximal end portion of the blade.

4,086,920

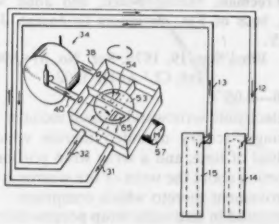
INTERMITTENT INFLATABLE APPARATUS

Jack K. Miniere, 685 Minnesota, Winter Park, Fla. 32789

Filed Sep. 13, 1976, Ser. No. 722,490

Int. Cl.[2] A61H *1/00*

U.S. Cl. 128—24 R **14 Claims**



1. An intermittent inflatable apparatus comprising in combination:

a fluid pump;

at least one inflatable member attached to a patient and being intermittently inflatable;

coupling means coupling said fluid pump to each said inflatable member whereby pressurized fluid is directed to each inflatable member, said coupling means having a first pair of chambers and a second pair of chambers separated by a variable valve member, said variable valve member having a plurality of openings therethrough at predetermined locations, thereby operatively connecting at least one first chamber and one second chamber; and

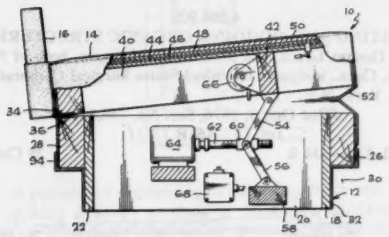
coupling means drive means operatively connected to said coupling means for driving said coupling means variable valve member between positions whereby at least one said inflatable member may be intermittently inflated.

4,086,921

THERAPEUTIC FOOTREST

David Gonzales, 140 Champa St., Vista, Calif. 92083, and Keith R. Ewing, 259 Brookside La., Oceanside, Calif. 92054

Filed Oct. 14, 1976, Ser. No. 732,525
Int. Cl.[2] A61H *21/00*
U.S. Cl. 128—24.2 **15 Claims**



1. A therapeutic footrest comprising:

a base;

a rest cushion pivotally mounted with respect to said base and selectively operable motor means connected between said rest cushion and said base for moving said rest cushion to an angular orientation with respect to said base;

a heater in said rest cushion for selectively heating the top surface of said rest cushion;

a vibrator connected to said rest cushion for vibrating said rest cushion; and

control means connected to said motor means and to said heater and to said vibrator for selectively controlling said motor means, said heater and said vibrator.

4,086,922

METHOD AND APPARATUS FOR TREATING CELLULITE CONTAINING AREAS OF THE HUMAN BODY

Burnis Henderson, 5214 17th St., Lubbock, Tex. 79416

Filed Sep. 8, 1976, Ser. No. 721,452
Int. Cl.[2] A61H *29/00*
U.S. Cl. 128—24.3 **7 Claims**

1. An instrument for treating areas of the human body having cellulite therein comprising:

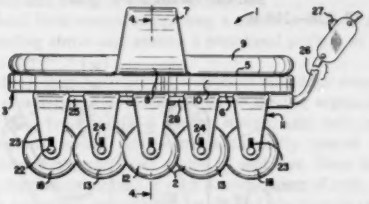
(a) a base member having an upper portion and a lower portion;

(b) a member connected to said base member and adapted for connecting a user's hand to said base member for manipulating and applying pressure thereto;

(c) a plurality of balls;

(d) means on said base member rotatably supporting said balls below and spaced from the base lower portion with the balls closely spaced and the centers thereof generally in a plane substantially parallel to said base member, the mounting permitting substantially independent movement of the balls in a direction normal to said plane;

(e) controlled heating means mounted on said base lower portion and positioned between said balls and said base member; said heating means being spaced a predetermined



distance from said balls and transmitting heat thereto through air convection; and

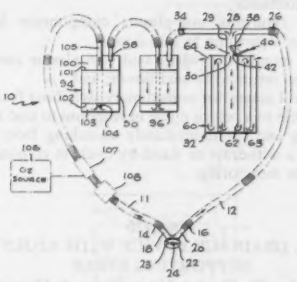
(f) means applying pressure to the balls to urge same downwardly to said plane and tending to equalize pressure of the balls on an uneven surface engaged thereby.

4,086,923

ALTITUDE CONDITIONING METHOD AND APPARATUS

Melvyn Lane Henkin, 19640 Greenbriar, Tarzana, Calif. 91356

Filed Jan. 5, 1976, Ser. No. 646,424
Int. Cl.[2] A61M *16/00*
U.S. Cl. 128—140 R **22 Claims**



1. Apparatus for supplying air for inspiration by a user having a lower oxygen concentration than the ambient air, said apparatus comprising:

inspiratory path means having open first and second ends and including means therein for permitting air flow only in the direction from said second to said first end;

expiratory path means having open first and second ends and including means therein for permitting air flow only in the direction from said first to said second end;

air reservoir means;

means coupling said expiratory path means second end to said reservoir means for supplying air thereto; and

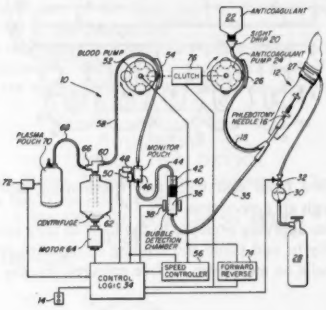
means coupling said inspiratory path means second end to said ambient air and said reservoir means for drawing air therefrom to supply a selected ratio of ambient air and air from said reservoir means to said inspiratory path means first end; and means for removing CO_2 from air flowing between said expiratory path means first end and said inspiratory path means first end.

4,086,924

PLASMAPHERESIS APPARATUS

Allen Latham, Jr., Jamaica Plain, Mass., assignor to Haemonetics Corporation, Natick, Mass.

Filed Oct. 6, 1976, Ser. No. 730,106
Int. Cl.[2] A61M 5/00, 1/03
U.S. Cl. 128—214 R **9 Claims**



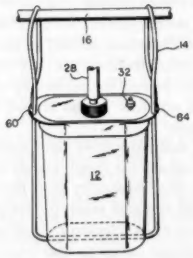
1. Plasmapheresis apparatus, comprising, in combination:
means for withdrawing whole blood from a donor;
means for supplying anticoagulant to said withdrawn whole blood;
means for separating anticoagulated whole blood into plasma and non-plasma components;
means for transporting anticoagulated, withdrawn, whole blood to said means for separating;
a plasma container for receiving plasma from said means for separating;
means for detecting when a predetermined quantity of separated plasma component has been introduced into said plasma container;
means for returning non-plasma components from said means for separating to said donor;
means for monitoring when said non-plasma components have been returned to said donor; and,
cycle control means for immediately switching from a withdraw cycle to a return cycle in response to said means for detecting and for immediately switching from a return cycle to a withdraw or stand-by cycle in response to said means for monitoring.

4,086,925

MEDICAL DRAINAGE DEVICE WITH ADJUSTABLE SUPPORTING STRAP

Larry H. Dodge, St. Charles, Mo., assignor to Sherwood Medical Industries Inc., St. Louis, Mo.

Filed Oct. 12, 1976, Ser. No. 731,598
Int. Cl.[2] A61J 1/00
U.S. Cl. 128—272 **21 Claims**



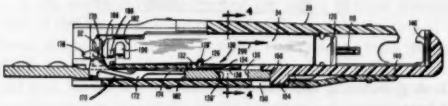
1. A medical drainage device comprising a container for receiving body fluid drainage from a patient, said container including fluid inlet means adapted for fluid communication with a source of body fluid drainage, an upper portion having two opposed sides with at least one groove in each of said opposed sides extending laterally inwardly from the outer periphery of said container, and a flexible strap, means for connecting opposite ends of said strap to said upper portion respectively adjacent said opposed sides, said strap connecting means being spaced from said grooves, said strap and each of said grooves being sized relative to each other to permit movement of selected portions of said strap into said grooves to provide a selected strap arrangement capable of supporting said container.

4,086,926

LIGATING AND DIVIDING ORGANIC STRUCTURES

David Thomas Green, and Richard A. McGarry, both of Norwalk, Conn., assignors to United States Surgical Corporation, New York, N.Y.

Filed Oct. 8, 1976, Ser. No. 730,821
Int. Cl.[2] A61B 17/11
U.S. Cl. 128—334 R **28 Claims**



1. A cartridge adapted to be powered by a surgical instrument, said cartridge being capable of confining an organic structure in a closed area within the cartridge, ligating said structure with a pair of spaced apart surgical staples, and severing said structure intermediate said surgical staples, the cartridge comprising: a rail assembly adapted to be removably mounted to an instrument, said rail assembly having a forward end; anvil means defined at the forward end of said rail assembly; an elongate main body mounted on said rail assembly for movement longitudinally relative to said rail assembly; a pair of belts mounted in said main body for movement longitudinally relative to said main body, each belt defining an index plane; a plurality of surgical staples carried by said belts in said index plane; a pair of pushers each having a forward end mounted in said main body for movement longitudinally relative to said main body, each pusher mounted adjacent a respective belt of said pair of belts, each pusher defining a pusher plane, said pushers having a projection at each of their forward ends adapted to extend into the index plane of a respective adjacent belt for advancing said belts and said staples carried thereon toward said anvil means; ramp means associated with said main body and said belts for singly transferring said staples from the index planes and into the pusher planes in response to the movement of said pushers toward said anvil means; a knife mounted in said main body for longitudinal movement relative to said main body; and shifter means associated with said knife and said main body for causing said main body to move forward into abutting relationship with said anvil means, wherein a closed area defined by said anvil means and said main body when said knife is initially moved toward said anvil means is capable of confining an organic structure.

4,086,927
USES IN TOBACCO AND AS A TOBACCO FLAVOR ADDITIVE OF ENOL ESTERS

Alan Owen Pittet, Atlantic Highlands; Erich Manfred Klaiber, Neptune; Manfred Hugo Vock, Locust, all of N.J.; Edward J. Shuster, Brooklyn, N.Y., and Joaquin Vinals, Red Bank, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

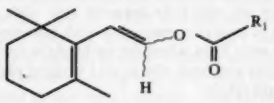
Continuation-in-part of Ser. No. 662,820, Mar. 1, 1976, Pat. No. 4,000,329, which is a continuation-in-part of Ser. No. 620,355, Oct. 7, 1975, Pat. No. 4,000,090, which is a continuation-in-part of Ser. No. 507,412, Sep. 19, 1974, Pat. No. 3,940,499. This application Sep. 15, 1976, Ser. No. 723,537

The portion of the term of this patent subsequent to Dec. 28, 1993, has been disclaimed.

Int. Cl.[2] **A24B** *3/12*

U.S. Cl. 131—17 R **12 Claims**

1. A process for augmenting or enhancing the aroma or taste of smoking tobacco comprising intimately admixing with smoking tobacco an augmenting or enhancing quantity of at least one enol ester defined by the structure:



wherein R_1 is straight chain alkyl having 1, 3, 7 or 11 carbon atoms.

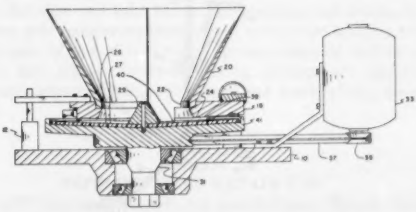
4,086,928
COIN SORTING MACHINE

Victor G. Ristvedt, Rte. 6, and Roy B. Johnson, Rte. 6, Belmar Cir., both of Manchester, Tenn. 37355

Filed Aug. 6, 1976, Ser. No. 712,187

Int. Cl.[2] **G07D** *3/00*

U.S. Cl. 133—3 A **12 Claims**



1. A coin sorting machine for sorting selected size coins comprising:

a fixed mounted, vertically disposed hopper having a top entrance and a bottom exit for coins;

a rotary coin carrying disc having a top surface on which coins are free to move and positioned under and spaced from said bottom exit of said hopper and extending radially outward beyond said hopper;

means for rotating said disc in a selected direction;

at least a generally outer annular portion of said top surface of said disc being of a flexible material;

peripheral limit means comprising a raised annular region extending above and around a peripheral portion of said disc; and

coin lifting means comprising a series of coin edge depressing means positioned over an outer annular segment of said disc constituting a sorting station, said coin edge depressing means being circumferentially spaced and positioned over an outer region of said disc, there being one depressing means for each denomination of coin, and each depressing means being positioned at a discrete radial distance from said peripheral limit means and above said flexible portion of said surface of said disc, and being positioned to engage and depress the radially positioned inner edge of a coin as it passes under a said depressing means, whereupon when the inner edge of a coin is depressed against said flexible material, the radially outer edge of the coin is raised, enabling it to be hurled by centrifugal force over said peripheral limit means and at a discrete angular peripheral position, enabling coins of a discrete size to be expelled at a discrete position and thereby coins to be denominationally sorter.

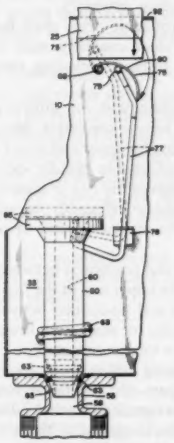
4,086,929
DOOR AND DRAIN CONTROL INTERLOCK

Ronald E. Focht, Offenburg, Baden, Germany, assignor to Hobart Corporation, Troy, Ohio

Filed Nov. 8, 1976, Ser. No. 739,443

Int. Cl.[2] **B08B** *3/02*

U.S. Cl. 134—56 D **6 Claims**



1. A dishwasher comprising:

a cabinet defining a cavity into which items to be cleaned are placed and an access opening into said cavity,

a washing fluid reservoir in said cabinet beneath said cavity for holding washing fluid for the dishwasher,

means for draining said washing fluid reservoir,

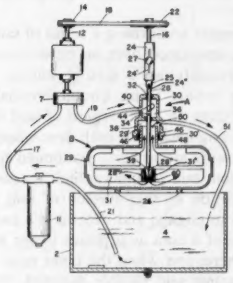
a door mounted on said cabinet for covering said opening, and

interlock means, responsive to the closing of said door when said means for draining is open, for closing said means for draining and permitting opening of said door without affecting said means for draining.

4,086,930
AUTOMATIC TRANSMISSION TORQUE CONVERTER FLUSHER

William K. Hiss, 7101 Belair Rd., Baltimore, Md. 21206

Filed Apr. 22, 1976, Ser. No. 679,161
Int. Cl.[2] B08B 9/00
U.S. Cl. 134—168 R 3 Claims



1. An improved machine for fluid cleaning automotive torque converters in which the torque converter comprises a hollow casing and a turbine independently rotatable within said casing wherein said casing is provided with a single opening within the casing and a hollow hub extending outwardly about said opening and beyond the outer surface of the casing and the turbine having an internal grooved opening extending centrally through the turbine and coaxially with the hollow open in the hub for receiving a driving means therefor and means for retaining the fluid cleaner comprising in combination:

a. means for fixedly positioning said torque converter with the hub extending upwardly,

b. a vertically rotatable drive shaft having means for supporting said shaft coaxially with the hub opening for rotating said turbine, including means for rotating said shaft,

c. a fluid directing unit for directing the cleaning fluid through said torque converter, said unit having a single casing including an upper and lower compartment including vertical adjustable spindle extending centrally and beyond the ends of the two compartments, one end of the spindle adapted to releasably engage at least one of the grooves in the turbine central opening for rotating the same,

d. a liquid tight seal positioned between the upper end of the spindle and the upper end of the fluid directing casing and a liquid tight seal positioned between the two compartments and means for sealing the lower compartment about the hub of the torque converter,

e. said spindle being hollow from a point positioned adjacent the first compartment and through the lower end thereof and having an opening therein leading from the first compartment to the lower end of the hollow spindle engaging the hollow opening in the turbine,

f. a liquid pressure pump for circulating the cleaning fluid,

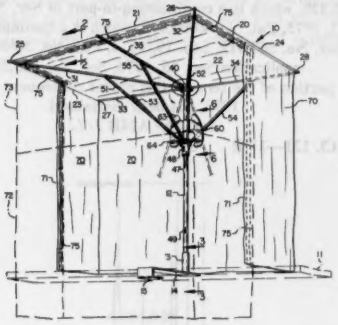
g. means connecting the pump with an inlet in the upper compartment for supplying the cleaning fluid thereto wherein the cleaning fluid is directed through the hollow spindle into the hollow central opening in the turbine after which the cleaning fluid is forced in contact with the inner surface of the casing with the aid of the rotatable turbine and outwardly through the hub to the lower compartment of the fluid directing unit,

h. said lower compartment having an outlet opening therein for exhausting the said cleaning fluid to the fluid supply means and means for recycling the cleaning fluid through the said torque converter.

4,086,931
UMBRELLA SHELTER

Warren E. Hall, Salem, Oreg., assignor to Sports-Brella Inc., Salem, Oreg.

Continuation-in-part of Ser. No. 689,458, May 24, 1976, abandoned. This application Jun. 3, 1977, Ser. No. 803,273
Int. Cl.[2] A45F 1/04, 11/00
U.S. Cl. 135—20 A 11 Claims

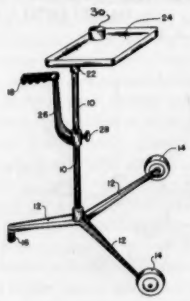


1. An umbrella shelter comprising a rectangular top piece of fabric having a back edge, a front edge and two side edges; an umbrella frame having a supporting pole disposed in a vertical plane through said back edge when the umbrella is open, ribs in said frame each hinged at one end to said pole, said ribs comprising a pair of front ribs extending to the front corners of said top fabric and a pair of back ribs in said vertical plane extending along and secured to said back edge of said top fabric and to the back corners of the top fabric; a slide ring on said pole for opening and closing the umbrella; strut links pivotally connected between said slide ring and said ribs including a pair of back strut links movable in said vertical plane; and a holder on said pole between said slide ring and the hinged ends of said ribs engagable with intermediate portions of said back strut links when the umbrella is open to hold said back strut links and back ribs in said vertical plane against the tension of said fabric.

4,086,932
WALKING AID

Veda N. Richardson, 11068 Strathern St., Sun Valley, Calif. 91352

Filed Jun. 25, 1975, Ser. No. 590,145
Int. Cl.[2] F16M 13/08
U.S. Cl. 135—67 5 Claims



1. A walking aid comprising: a generally horizontal bracket having first and second arms extending outwardly in a generally horizontal plane from a converging point in the plane; a pair of wheels mounted on the respective distal ends of the first

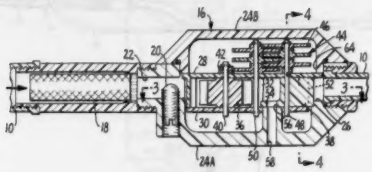
and second arms of the bracket in spaced relationship for rotation about a common axis; an upstanding elongated cane-like member mounted at the converging point of the first and second arms of the bracket at a position displaced from the axis of rotation of the wheels and extending upwardly from said horizontal plane; a projection member extending downwardly below the horizontal plane to support a downward weight exerted on the cane-like member a handle mounted on the cane-like member comprising a rigid elongated member extending outwardly from the axis of the cane-like member; and a generally horizontal tray mounted on the upper end of said cane-like member on the other side thereof from the handle.

4,086,933

AUTOMATIC POOL CLEANER SYSTEM WITH TIMER DEVICE

Andrew L. Pansini, 180 Los Cerros Dr., Greenbrae, Calif. 94904

Division of Ser. No. 565,805, Apr. 7, 1975, Pat. No. 4,007,749.
This application Sep. 23, 1976, Ser. No. 719,903
Int. Cl.[2] A01G *27/00*
U.S. Cl. 137—119 **1 Claim**



1. A water flow control device for swimming pool cleaners comprising a housing having an internal compartment and having axially aligned water inlet and outlet openings therefor whereby said device is adapted to be connected into a water supply hose for a pool cleaner, a water wheel and means mounting it for rotation within said housing adjacent said inlet opening and in the path of water coming into said housing through said inlet opening, a wheel-like rotary multi-valving member and means mounting it for rotation within said housing adjacent said outlet opening and in the path of water flowing from said inlet to said outlet opening, said valving member comprising a plate valving element and an arcuate segmental valving element, the latter being associated with said outlet opening, a secondary discharge passageway formed in said housing terminating adjacent said plate valving element, a port in said plate element adapted to communicate with said secondary discharge passageway when water flow through said outlet opening is restricted by said arcuate segmental valving element and adapted to be out of communication with said secondary discharge passageway when said arcuate segmental valving element is in non-restricting relation to said outlet opening, a pair of spaced parallel plates positioned within said housing in laterally enclosing relation to said water wheel and said multi-valving member and serving to constrain the flow of water between said inlet and outlet openings, and means, including gear reducer means disposed within said housing and at the side of one of said plates opposite the side thereof at which said wheel and multi-valving member are located, driveably interconnecting said wheel and multi-valving member.

4,086,934

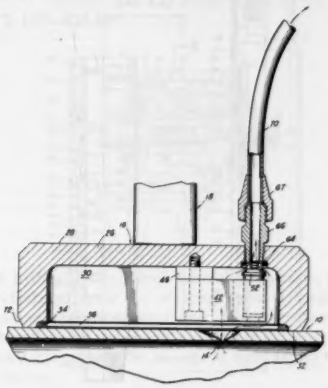
PIPELINE WELD REPAIR CAP

Marshall Underwood Bagwell, and Arnold Eugene Barrett, both of Atlanta, Ga., assignors to Colonial Pipeline Company, Atlanta, Ga.

Filed Sep. 13, 1976, Ser. No. 722,720
Int. Cl. F16k *43/00*
U.S. Cl. 137—322 **12 Claims**

1. Apparatus for repairing a defect in a pipeline without interrupting service through the pipeline comprising in combination:

a repair body having an elongate, narrow and substantially flat bottom surface provided with a recess to define a footprint surface which surrounds the defect in the pipeline, said recess being stepped around the inner periphery of said footprint surface, said body having circumscribing and inwardly bevelled side walls intersecting said footprint surface and defining an outer periphery of said footprint surface closely adjacent said recess and in at least close proximity to the pipeline to permit such outer periphery to be joined to the pipeline by welding, and a resilient gasket disposed within the stepped portion of the recess;



means for clamping said body temporarily against the pipeline so that said gasket sealingly engages between said body and the pipeline in circumscribing relation around the defect;

said body having a vent opening leading to said recess and valve means within said recess and aligned with said vent opening normally to prevent communication between said recess and ambient atmosphere through said vent opening, said valve means comprising a valve block secured within said recess, a valve member slidable in said block and aligned with said vent opening, and spring means normally urging said valve member toward said vent opening; and

conduit means removably received in said vent opening for temporarily opening said valve means while said body is being welded to the pipeline.

4,086,935

REMOTE CONTROLLED TUBING SAFETY VALVE

George M. Raulins, and Fleming A. Waters, both of Dallas, Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Continuation of Ser. No. 605,211, Aug. 15, 1975, abandoned.
This application Mar. 4, 1977, Ser. No. 774,670
Int. Cl. F16k *17/02*
U.S. Cl. 137—522 **12 Claims**

1. A remote controlled tubing safety valve comprising:

a housing having a longitudinal bore for providing a fluid flow path, extending therethrough;

a check valve including a valve member and a valve seat disposed in the bore of said housing and means for urging said valve member to a bore closing position onto said valve seat;

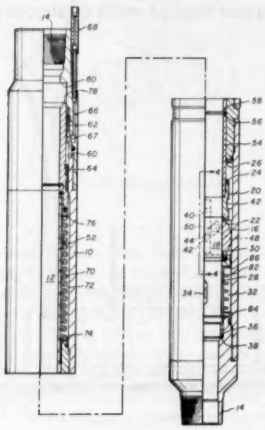
valve member operator means, including at least two sleeve means disposed in said longitudinal bore and with each of said two sleeve means being axially movable therein between a first and second position and having a passage

extending longitudinally therethrough through which fluids may flow;

one of said two sleeve means defining an annulus between said housing and said one sleeve means;

the other of said two sleeve means controlling movement of said valve member;

said one sleeve means when in its first position maintaining said other sleeve means in its first position with said other sleeve means in turn maintaining said valve member in a bore opening position and when in said second position not interfering with the movement of said other sleeve means;



pressure responsive means, including a pressure chamber formed in said annulus, for moving said one sleeve means to said first position when said means is acted upon by pressurized fluid; and

biasing means for moving said one sleeve means to said second position upon a decrease of fluid pressure acting upon said pressure responsive means to a selected value;

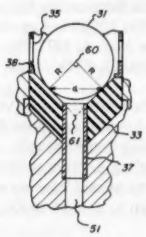
said valve member being normally moved to a bore closing position by said means for urging and being movable towards a bore opening position by fluid being pumped through said longitudinal bore in a first direction without affecting said biasing means when said one sleeve means is in said second position.

4,086,936

VARIABLE SEAT CHECK VALVE

William Duncan Vork, Edina, Minn., assignor to Graco Inc., Minneapolis, Minn.

Filed Aug. 16, 1976, Ser. No. 714,293
Int. Cl.[2] F16K *15/04*
U.S. Cl. 137—533.11 **5 Claims**



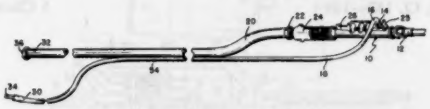
1. In a valve apparatus having a ball and seat combination surrounded by a valve housing except for a fluid flow passage through said seat and which may be obstructed by said ball, the improvement comprising a resilient seat member having its outside surfaces supported against said valve housing, and having a first inside surface defining said fluid flow passage, and having a second inside surface facing said ball with a frustoconical shape converging toward said first inside surface; a spherical ball having a size such that the diameter of unloaded line contact of said ball against said second inside surface is proximate to the midpoint of said frustoconical shape; and a rigid supporting sleeve in said fluid flow passage adjacent said first inside surface.

4,086,937

DUAL HOSE

Valentine Hechler, IV, 26 Meadow View Rd., Northfield, Ill. 60093

Filed Aug. 6, 1976, Ser. No. 712,230
Int. Cl.[2] F16K *19/00*; F16L *11/06*
U.S. Cl. 137—559 **6 Claims**



1. A liquid mixture dispensing device comprising:

a portable manually controlled proportioning and mixing aspirator dispenser having respective inlet ports longitudinally spaced from each other a predetermined distance to receive a solvent and a solute separately in longitudinally spaced relation;

a dual liquid supply hose unit having solvent and solute inlets and outlets likewise spaced in longitudinally spaced relation and connected to said respective inlet ports and solvent and solute inlet likewise spaced and connected to sources of supply of solvent and solute respectively;

said supply hose unit comprising flexible conduit elements of different flow characteristics having fusible materials engaging each other in fused relationship over a major portion of their length intermediate the groups of said spaced inlets and outlets,

said fused materials forming a common integrated reinforcing rib means of an extra thickness at its center of fusion in a plane connecting the center lines of said tubes greater than the respective thickness of the fused material adjacent thereto on opposite sides of said connecting plane, to bend in all directions yet normally urge the conduits to be straight as a unit over their joined length.

4,086,938

DOOR AND DRAIN CONTROL INTERLOCK

George Churley, Troy, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed Nov. 8, 1976, Ser. No. 739,445
Int. Cl.[2] B08B *3/02*
U.S. Cl. 137—586 **3 Claims**

1. In a dishwasher including:

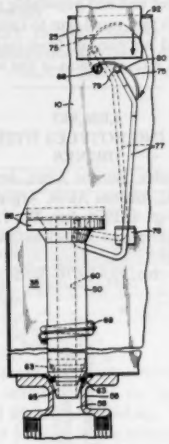
a cabinet defining a cavity into which items to be cleaned are placed and an access opening into said cavity,

a closure means for covering said opening,

a washing fluid reservoir in said cabinet beneath said cavity,

a standpipe mechanism in said reservoir which is movable from an upper position in which a drain in the bottom of said reservoir is opened to a closed, lower position in which the fluid level in said reservoir is maintained at an operating level, the improvement comprising:

linearly actuatable linkage means for moving said standpipe mechanism between said opened and closed positions, and



pivotal linkage means, responsive to said closure means covering said access opening, for moving said linearly actuatable linkage means such that said standpipe mechanism is moved into its closed lower position, whereby said washing fluid reservoir will not be inadvertently drained, said pivotal linkage means being operable to move said standpipe mechanism to the open position only when said closure means is open and independently of movement of said closure means.

4,086,939

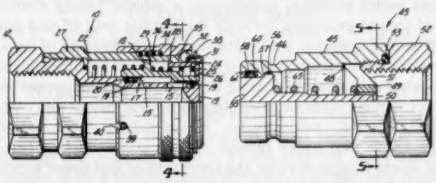
COUPLING ASSEMBLY

Wayne E. Wilcox, Union City, and Frank L. Foster, Corry, both of Pa., assignors to Snap-Tite, Inc., Union City, Pa.

Filed Sep. 3, 1976, Ser. No. 720,243

Int. Cl.[2] F16L *37/28*

U.S. Cl. 137—614.03 **15 Claims**



1. A coupler for connecting a fluid line under pressure comprising a body and valve, sliding sleeve means positioned relative to said valve, said sliding sleeve means selectively blocking fluid flow through the coupler, spring means biasing the sliding sleeve means to block fluid flow, sliding cover means positioned relative to said sliding sleeve means, second spring means biasing said sliding cover means to a position which is flush with a forward face of the coupler, said sliding cover means selectively activating the sliding seal means, and locking means positioned relative to said sliding cover means; said valve and body, sliding sleeve means, and sliding cover means presenting a relatively smooth, complete surface when fluid flow is blocked by said sliding sleeve means.

4,086,940

HYDRAULIC POWER-STEERING SYSTEM FOR VEHICLES

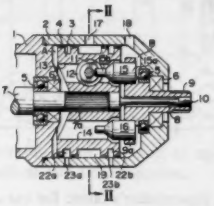
Hiroshi Yoshida, Toyokawa, and Hajime Kozuka, Okazaki, both of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Mar. 24, 1976, Ser. No. 669,968

Claims priority, application Japan, Apr. 5, 1975, 50-40794; Apr. 15, 1975, 50-51040[U]; May 10, 1975, 50-56509

Int. Cl.[2] F15B *9/10*

U.S. Cl. 137—625.69 **2 Claims**



1. A hydraulic directional control mechanism, comprising:

a cylindrical rotor for rotating about a longitudinal axis having a pair of opposed ends, a passage extending axially therethrough and opening at each of said ends, and a valve bore intersecting the passage at right angles to the axis of rotation;

a housing having a cylindrical interior space with said cylindrical rotor disposed therein, wherein the housng interior is dimensioned to form a close fit with said rotor to permit rotation thereof when a sufficiently strong torque is applied to said rotor and to form respective fluid chambers within the housing interior opposite respective ends of said rotor, wherein the respective fluid chambers are in communication through the passage and are thereby maintained at an equal pressure for preventing axial force imbalance on said rotor caused by fluids within the chambers, and said housing having a fluid supply port adjacent said rotor for introducing a working fluid into said housing, a pair of fluid flow ports adjacent said rotor and a return port communicating with one of said fluid chambers for discharging fluid from said housing;

valve means, comprising a spool valve disposed within said valve bore and fluid conduits between the fluid supply port and the valve bore and between the valve bore and the fluid flow ports, for controlling a flow of working fluid between the fluid supply port and a selected one of the fluid flow ports according to a position of said spool valve within the valve bore, wherein the fluid chambers defined within said housing at respective ends of said rotor are always in communication with each other through the passage extending through said rotor and the valve bore intersecting the passage;

an input shaft mounted on said housing for rotation coaxially with said rotor and having an end portion within said housing;

a pin mounted on said end portion of said input shaft and extending into said passage and having a tapered end portion engaging said spool valve to position the same within the valve bore, whereby rotation of said input shaft effects displacement of said pin and positions said spool valve within said bore until said input shaft is sufficiently rotated so that said pin contacts a wall of said passage whereupon further rotation of said input shaft is effective to rotate said rotor with said pin extending into said passage and bearing against the passage wall;

a torsion bar connected between said rotor and said input shaft coaxially with their respective axes of rotation and having a torsional stiffness for permitting said torsion bar to twist as said input shaft rotates relative to said rotor without rotating said rotor before said pin engages the wall of said passage through said rotor,

and an axial bore extending into said rotor and having internal splines or serrations for coupling said rotor to an output shaft.

4,086,941

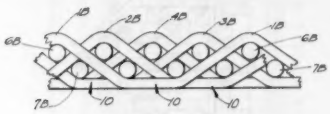
BIPLANAR PAPERMAKER'S BELT

Charles E. Thompson, Albany, N.Y., assignor to Huyck Corporation, Wake Forest, N.C.

Filed Oct. 26, 1976, Ser. No. 735,263

Int. Cl.[2] D03D *3/04*

U.S. Cl. 139—387 R **9 Claims**



1. An endless papermaker's fabric for use on a papermaking machine, said fabric having continuous filling yarns extending in the machine direction and warp yarns extending in the cross-machine direction to define the width of the fabric, said fabric comprising sets of spaced apart upper and lower filling yarns interconnected by warp yarns to form a biplanar fabric having an upper paper contacting surface and a lower machine contacting surface, said sets of filling yarns being diagonally disposed relative to each other with said warp yarns extending diagonally downwardly from the top to the bottom surfaces of the fabric between adjacent sets of said filling yarns, and extending diagonally upwardly from the bottom to the top surfaces of the fabric between the upper and lower filling yarns of another of said sets of diagonally disposed filling yarns, the upper and lower filling yarns being separated solely by said warp yarns, whereby the filling yarns lie in biplanar relation with respect to each other.

4,086,942

WEFT FEED TENSIONING DEVICE IN LOOMS HAVING A STATIONARY WEFT SUPPLY

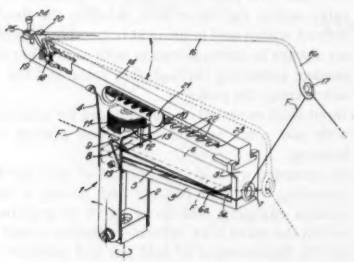
Alberto Merisio, Colzate, Italy, assignor to Somet Societa Meccanica Tessile, S.p.A., Gazzaniga, Italy

Filed Jul. 20, 1976, Ser. No. 707,019

Claims priority, application Italy, Jul. 25, 1975, 25756 A/75

Int. Cl.[2] D03D *47/34*

U.S. Cl. 139—450 **5 Claims**



1. A device for adjustably tensioning the weft in loom weaving from a stationary weft supply, to be applied at the side of the loom from which the weft is fed to the members carrying the weft through the shed, comprising, a single support, a pair of elastic resilient metal laminae, arranged substantially parallel to each other and on opposed sides of the path of the weft, one of said laminae being fixed with both ends to said support, said other metal lamina mounted cantilevered on said support, means acting on said other lamina to urge its free end into contact with the first lamina with an adjustable pressure for engaging said weft between the laminae and providing for the braking thereof, an oscillating lever having at one end a thread-guide, through which passes the weft after engagement between said laminae and before reaching said carrying members and at the other end a small arm, means pivotally mounting said lever at said other end and adjustable spring means acting on said lever through said small arm to cause it to oscillate and move away from said laminae and from said members, in order to take up slack and retain tension in the weft.

4,086,943

VALVE FOR FILLING BOTTLES WITH PRESSURIZED DRINKS

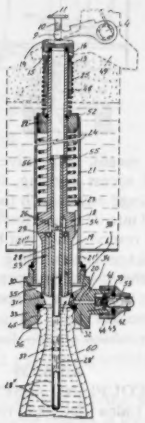
Juan Manuel Fernandez, Buenos Aires, Argentina, assignor to Val-Marco S.A.I.C., Buenos Aires, Argentina

Filed Sep. 8, 1976, Ser. No. 721,544

Claims priority, application Argentina, Sep. 16, 1975, 260398; Jan. 30, 1976, 262095

Int. Cl.[2] B67C *3/06*

U.S. Cl. 141—39 **3 Claims**



1. In a back pressure filling valve for bottles designed for containing pressurized drinks, wherein the bottles are filled from a tank having a bottom wall and containing a liquid and a gas under pressure, comprising, a tubular casing element fixed to and extending through the bottom wall of said tank and having openings within the tank for the passage of liquid, a valve body member having a cylindrical portion slidably mounted in said tubular casing element and having uppper and lower tubular portions extending above and below said cylindrical portion, respectively, a ventilation tube slidably mounted in said upper tubular portion and extending below said lower tubular portion, the inner wall of said lower tubular portion being of greater diameter than that of the ventilation tube, providing an annular cavity therebetween, an elastomeric check valve mounted on said valve body member and having a frusto-conical portion engageable with said ventilation tube, an annular cylindrical body member mounted on the lower end of said tubular casing, a diaphragm valve member mounted at its outer circumference on said annular cylindrical body member and having a central concentric opening slidably engaging the lower tubular portion of the valve body member, said annular cylindrical body member having a frusto-conical surface beneath said diaphragm valve member and engageable

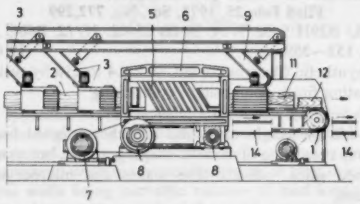
thereby in the open position of said valve member, said ventilation tube having orifices above said elastomeric check valve whereby said check valve controls fluid flow through said orifices.

4,086,944

METHOD AND APPARATUS FOR THE PRODUCTION OF TIMBER FROM ROUND LOGS

Josef Traben, Oberkirch, Baden, Germany, assignor to Firma Gebruder Linck Maschinen Fabrik und Eisengiesserei, Oberkirch, Baden, Germany

Filed Aug. 25, 1975, Ser. No. 607,298
Claims priority, application Germany, Apr. 5, 1975, 2514901
Int. Cl.[2] B27L *9/00*
U.S. Cl. 144—3 P **9 Claims**



1. Apparatus for producing commercial timber from round logs in which the central area of the log is machined into squared timber, said apparatus including:

a transporting and feeding device which receives the round log and moves it in its longitudinal direction; and

at least one machining device including:

a shiftable frame;

a series of peeling knives secured to said frame, said knives being staggered one behind the other in the direction of feed,

said frame having a plurality of parallel elongate projections each disposed in close spaced relation to a respective peeling knife edge to define a cutting-support means therefor; and

means for driving said frame to effect unitary periodic movement of said knives and said projections whereby a controlled cutting action is imparted against said log as the latter is moved longitudinally.

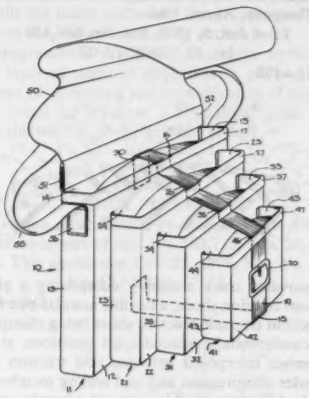
4,086,945

BAG FOR CARRYING MOTION PICTURE FILM CANS OF DIFFERENT SIZES

Neal E. Carter, 235 Palisades Ave., Yonkers, N.Y. 10703

Filed Aug. 11, 1976, Ser. No. 713,414
Int. Cl.[2] B65D *69/00*
U.S. Cl. 150—52 J **5 Claims**

1. A bag for carrying articles such as different sized cans of motion picture film, comprising a series of upwardly opening generally rectangular pockets, joined together and arranged stepwise from a smallest front pocket to a largest rear pocket with at least one intermediate pocket, all of said pockets being rectangular and similar in shape with rectangular rear, front, side and bottom panels, the depth and width of each pocket being substantially greater than the distance from front to back of such pocket, a central loop means at the upper part of the front panel of each pocket and a belt arranged to fit slidingly through said slots for releasable attachment at the front of the bag to secure articles within the pockets, a cover flap attached to the rear panel of the largest of the pockets for covering all of the pockets, a reinforcing member extending across the width of said cover within the cover parallel and adjacent to a line along which the cover joins said rear panel of said largest



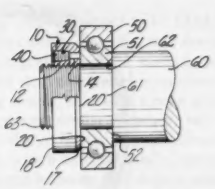
pocket, and a carrying strap attached to upper portions of opposite side panels of said largest pocket.

4,086,946

LOCKING NUT

Ralph Otto Keen, Roseville, Mich., assignor to Taper Line, Incorporated, Roseville, Mich.

Filed May 7, 1976, Ser. No. 684,348
Int. Cl.[2] F16B *39/04*
U.S. Cl. 151—21 C **11 Claims**



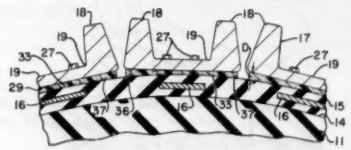
1. A locking nut comprising a nut body member of conventional structure having two end faces and a longitudinal bore extending from face to face, at least one slot substantially concentric with said longitudinal bore interposed said two end faces of said nut body member, said at least one slot defining a resilient segment portion of uniform circumferential width along its axial length, said resilient segment portion configured to freely deflect radially, said resilient segment portion further communicating with said nut body member proximate the ends of said at least one slot, said resilient segment portion being fixed at each end of said at least one slot and further being symmetrically deformable by said concentricity of said at least one slot and wedging means engageable with two opposite walls of said slot for communicating with said walls so as to cause a uniform deformation of said longitudinal bore, said wedging means producing a radial deflection of said resilient segment portion fixed at both ends such that the deflection of said resilient segment portion is generalized along the length thereof to increase the holding power of said nut body member.

4,086,947

TRACTION SHOE SEAL

Roger E. Payne, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 5, 1976, Ser. No. 646,436
Int. Cl.[2] B60C *11/02*
U.S. Cl. 152—175 **16 Claims**



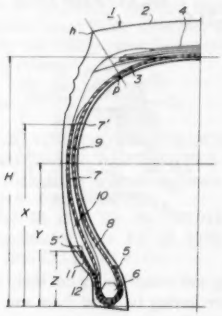
1. A removable track assembly comprising a plurality of wear-resistant traction shoes, a flexible annular belt for mounting on a resilient tire, said traction shoes being clamped on said belt at circumferentially spaced-apart positions, at least one sealing member interposed between said traction shoes and said belt under compression and said sealing member having a surface of highly compressible material whereby said surface conforms to irregularities in said track assembly to seal the spaces between said traction shoes and said belt.

4,086,948

RADIAL TIRE FOR HEAVY LOAD VEHICLES

Yasuo Suzuki, Akigawa; Akira Tamura, Higashi-Murayama; Shigeru Sugihara, Fussa, and Toshiro Tezuka, Higashi-Murayama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Jul. 26, 1976, Ser. No. 708,451
Claims priority, application Japan, Jul. 30, 1975, 50-91975
Int. Cl.[2] B60C *9/00*
U.S. Cl. 152—355 **6 Claims**



1. In a radial tire for heavy load vehicles having a crown portion forming a tread, a pair of side portions for supporting the crown portion, each side portion having a root, a pair of bead portions each having a bead core and for mounting the root of each side portion on a tire rim, a carcass ply composed of a steel cord ply extending from the crown portion through both the side portions to both the bead portions, the carcass ply being wound around the bead core from the inside toward the outside thereof to form a turn-up portion, a chafer composed of a steel cord ply superimposed about the turn-up portion of the carcass ply, said chafer being wound around the bead core from the inside toward the outside thereof to reinforce the bead portion, and a plurality of inextensible belts superimposed about the carcass ply and reinforcing the crown portion, the improvement comprising: upwardly extending the upper end of the turn-up portion of the carcass ply to a position located between a point passing over the maximum width point of the carcass ply expanded by applying an internal pressure to the tire and a point where a normal drawn perpendicular from a hump to the carcass ply crosses with the carcass ply and reinforcing the side portion of the tire, and a soft rubber layer separating the turn-up portion of the carcass ply from the carcass ply, said soft rubber layer composed of rubber having a Shore A hardness which is smaller than a Shore A hardness of a coating rubber of the carcass ply and a 300% modulus of elasticity which is 50% to 85% of a 300% modulus of elasticity of the coating rubber of the carcass ply.

4,086,949

FILAMENTS COATED WITH A FATIGUE REDUCING FINISH COMPRISING A POLY(VINYL ALKYL ETHER) USED AS REINFORCEMENTS IN RUBBER ARTICLES

William Cheng Uy, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 25, 1977, Ser. No. 772,299
Int. Cl.[2] B29H *9/02, 9/04;* **B32B** *25/02, 31/12;* **B60C** *1/00*
U.S. Cl. 152—359 **19 Claims**

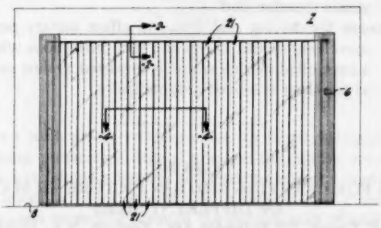
1. A synthetic filament coated with 0.4 to 2% by weight of a lubricating finish composition comprising
(1) 60–96% by weight of a lubricant oil,
(2) 1–6% by weight of a solid lubricant selected from the group consisting of metallic soaps, graphite, boron nitride, fumed silica, polyalkylene waxes and microcrystalline waxes,
(3) 1–15% by weight of a poly(vinyl alkyl ether) having 1–4 carbon atoms in the alkyl group and
(4) 0–30% by weight of an emulsifier.

4,086,950

DOORWAY SCREEN

H. Douglas Power, Cupertino, Calif., assignor to Necor Corporation, Menlo Park, Calif.

Filed Mar. 16, 1977, Ser. No. 778,061
Int. Cl.[2] A47H *1/00*
U.S. Cl. 160—332 **2 Claims**



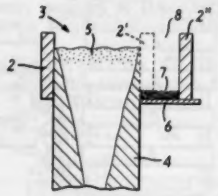
1. A doorway screen comprising a transverse header, a plurality of elongated flexible strips, said strips each having in transverse cross-section a relatively thin, relatively wide and substantially flat central portion and a pair of relatively thick, relatively narrow bead ends merging smoothly with said central portion whereby said bead ends when hanging freely are transversely slidable across and away from the central portion of adjacent similar strips, means for securing said strips to said header including continuous means for clamping a plurality of said strips in overlapping relationship at the top against relative transverse displacement with respect to each other and with said bead ends of alternate strips lying against said central portion of an intervening one of said strips and spaced transversely apart and defining between them substantially enclosed air pockets parallel to said bead ends, said air pockets being substantially closed at the top by said clamping means.

4,086,951

APPARATUS FOR CHANGING WIDTH OF A CAST PIECE IN A CONTINUOUS CASTING OPERATION

Riyota Takahasi; Takayosi Yamada; Makoto Kimura, and Seiji Yosikawa, all of Tohkai, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Division of Ser. No. 585,505, Jun. 10, 1975, Pat. No. 4,022,265. This application Jan. 12, 1977, Ser. No. 758,780
Claims priority, application Japan, Jun. 12, 1974, 49-67006
Int. Cl.[2] B22D *11/06*
U.S. Cl. 164—73 2 Claims



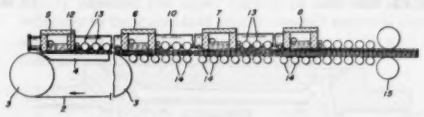
1. An apparatus for enlarging the width of a cast piece which comprises a single mold consisting of a pair of opposed longitudinal walls and a pair of transverse walls extending between said longitudinal walls in contact therewith, at least one of said transverse walls being movable relative to said longitudinal walls for enlarging the width of the mold; a supporting plate disposed under said movable transverse wall; means for moving said movable transverse wall and connected to an outside wall surface of the movable transverse wall; and means for movably positioning said supporting plate back and fore freely under the movable transverse, said wall means being connected to an edge of the supporting plate.

4,086,952

METHOD FOR PRODUCING A UNIFORM CRYSTAL STRUCTURE BY CONTINUOUS CASTING

Erik Allan Olsson, Oerlikonerstrasse 88, Zurich, Switzerland

Filed Oct. 16, 1975, Ser. No. 622,970
Claims priority, application Switzerland, Nov. 1, 1974, 014658/74
Int. Cl.[2] B22D *11/06, 11/124*
U.S. Cl. 164—88 5 Claims



1. The method of converting molten metal into a solid product having a substantially uniform fine crystalline structure throughout which comprises:

(a) forming at a first casting station a continuous imperforate primary strand of metal of a less thickness than the end product to be formed by moving a chill surface continuously in contact with a pool of molten metal supplied from a source of molten metal to progressively develop a solidified thin layer over said chill surface,

(b) continuously stripping the solidified primary layer from the chill surface with the surface which solidified in contact with the chill surface as the inside surface, and the opposite surface the outside surface,

(c) moving the strand so formed over a cooled supporting surface with the inside surface contacting the supporting means,

(d) cooling the outer surface of the primary strand so formed,

(e) then, at a second casting station separated and removed from the first, applying and bonding to the moving cooled outer surface of the primary strand a layer of molten metal from the same source as that supplied to the first station and while the inside surface of the primary strand is supported on the chilled supporting surface,

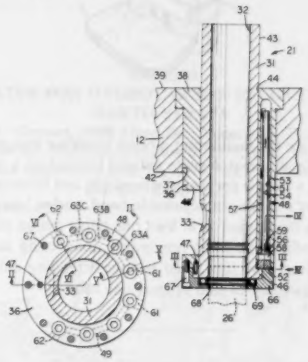
(f) and progressively contacting the outer surface of the molten layer of metal so applied with cooling means to accelerate rapid cooling and crystallization of said layer of molten metal to develope a crystalline grain structrue comparable to that of the primary strand.

4,086,953

SHOT SLEEVE

David M. Kraklau, 1901 Lassin, St. Joseph, Mich. 49085

Continuation-in-part of Ser. No. 552,775, Feb. 24, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,873
Int. Cl.[2] B22D *17/12*
U.S. Cl. 164—312 8 Claims



1. A shot sleeve assembly for a die casting machine, comprising:

an outer cooling sleeve adapted to be fixedly mounted on a platen of a die casting machine, said cooling sleeve comprising an integral one-piece annular member, and an elongated shot sleeve disposed concentrically within said outer cooling sleeve, said shot sleeve also comprising an integral one-piece annular member, said cooling sleeve and said shot sleeve having a small diametrical clearance therebetween which extends axially throughout the complete axial length between said sleeves when they are both at ambient temperature;

said shot sleeve having an elongated bore extending therethrough for receiving therein a high temperature casting material, an inlet opening formed in the sidewall of the shot sleeve adjacent one end thereof for permitting said casting material to be deposited into said bore, and a plunger slidably supported within the bore of said shot sleeve; and

said cooling sleeve having cooling means associated therewith for permitting extraction of heat from said shot sleeve, said cooling means comprising a plurality of axially extending passage means extending over a majority of both the axial and circular extent of said cooling sleeve for permitting circulation of a liquid coolant therethrough to cause extraction of heat from said shot sleeve over a majority of the axial length and circular extent thereof, said passage means being formed totally interiorly of said cooling sleeve between the inner end outer annular surfaces thereof so that the coolant flowing through said passage means is confined solely by said cooling sleeve and does not directly contact the shot sleeve, and said cooling sleeve having inlet and outlet opening means formed therein and communicating with said passage

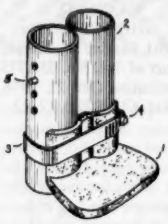
means for respectively permitting liquid coolant to be supplied thereto and extracted therefrom.

4,086,954

FLASK AND PATTERN STARTER

John L. Petty, Jr., Route No. 3, Walnut Ridge, Ark. 72476

Filed Nov. 1, 1976, Ser. No. 696,265
Int. Cl.[2] B22D *17/22*
U.S. Cl. 164—404 2 Claims



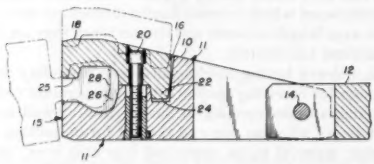
1. A device for facilitating a bond breaking movement of a cope flask from a match-plate pattern located on a drag flask, comprising a handle for use as a handrest and leverage surface for a molder's hands, an adjustable band, and at least one tube for locating the device on at least one guide pin on such a drag flask, said adjustable band removably connecting said handle to said at least one tube, said handle extending substantially radially outwardly of said at least one tube.

4,086,955

HEAD FOR A STARTER BAR USED IN THE CONTINUOUS CASTING OF MOLTEN METAL

Joseph Pietryka, Paris, France, assignor to Fives-Cail Babcock, Paris, France

Filed Dec. 15, 1976, Ser. No. 750,617
Claims priority, application France, Dec. 18, 1975, 75 38791
Int. Cl.[2] B22D *11/08*
U.S. Cl. 164—446 5 Claims



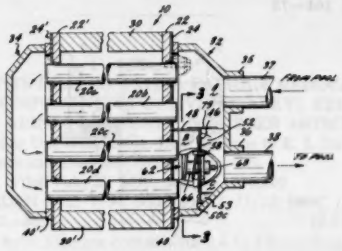
1. A head for a starter bar used in the continuous casting of liquid metal, the head having two large faces and an upper face extending therebetween, one of the large faces defining a chamber reaching to the upper face, an insert of complementary shape removably mounted in the chamber, and the head and insert together defining a transverse elongated cavity opening only into the upper face of the head, the cavity being adapted to hold molten metal poured thereinto through the opening and having a cross section at the upper face smaller than the cross section of the remainder of the cavity, and the plane of separation between the portion of the cavity defined by the head and that defined by the insert being so disposed that cast solidified metal formed in the cavity may be lifted out of the portion of the cavity in the head after the insert has been removed.

4,086,956

TEMPERATURE CONTROL OF HEAT EXCHANGER WITH BYPASS

Leo Block, Woodland Hills, and Larry Ashton, Thousand Oaks, both of Calif., assignors to Raypak, Incorporated, Westlake Village, Calif.

Filed Jan. 16, 1975, Ser. No. 538,641
Int. Cl.[2] G05D *15/00*
U.S. Cl. 165—38 14 Claims



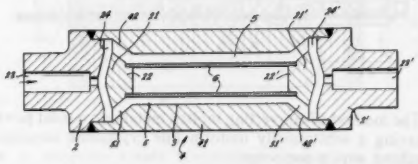
1. In a flow governor system adapted for controlling a heat exchanger of a type having a fluid inlet and a fluid outlet with bypass means from the inlet to the outlet, the improvement comprising in combination, means forming an enclosure for receiving heated fluid and having a valve port, a valve member for controlling said valve port, temperature responsive means responsive to temperature of fluid from the heat exchanger for adjusting said valve member, and means forming a bypass port providing communication to the downstream side of said valve port of fluid from said inlet which mixes with fluid downstream of said valve port passing to said fluid outlet, said means forming a bypass port being constructed to provide for flow independently of said temperature responsive means.

4,086,957

WITHDRAWAL ROLL IN CONTINUOUS CASTING MACHINE

Hans Schrewe, Duisburg; Hans-Dieter Fünderich, Kettwig, and Hans Butz, Duisburg, all of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Sep. 16, 1975, Ser. No. 613,847
Claims priority, application Germany, Sep. 16, 1974, 2444614
Int. Cl.[2] F28F *5/02*
U.S. Cl. 165—89 1 Claim



1. Roll for continuous casting machines having an inner tubular core and an outer tubular member defining an axial gap as a central cylindrical flow space for cooling liquid, said outer member having an inner diameter at the central flow space and larger diameters near the axial ends of the outer member, the flow space being of conical configuration near the axial ends of the roll and having a larger diameter portion than the diameter of the central flow space accordingly, so that portions of the flow space closer to the axial ends of the roll have larger distance from the roll axis than the central flow space has, a pair of journal members being interconnected by a cylindrical element constituting said inner tube core, said outer tubular member having conically widened inner diameter portions near its axial ends defining said conical flow spaces together

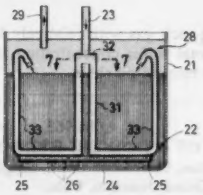
with conically contoured portions of said journal members, each journal member having a central duct from which extend internally radially extending ducts communicating with said conical flow spaces said inlet ducts for feeding coolant to and discharging the coolant from the portions of the flow spaces of largest diameter.

4,086,958

HEAT EXCHANGE METHOD AND APPARATUS INCLUDING TWO NON-MIXABLE MEDIA

Friedrich Lindner, Stuttgart, and Frank Mehlhorn, Weinstadt, both of Germany, assignors to Deutsche Forschungs- und Versuchsanstalt fur Luft- und Raumfahrt e.V., Bonn, Germany

Filed Feb. 17, 1977, Ser. No. 769,735
Claims priority, application Germany, Feb. 21, 1976, 2607168
Int. Cl.² F28D *21/00*
U.S. Cl. 165—104 S **9 Claims**



1. Heat exchanger apparatus for exchanging heat between first and second media having different temperatures, said first medium being a substance operable between liquid and solid phases as a function of temperature, said second medium being a fluid, said first and second media being non-mixable when said first medium is in the liquid phase, which comprises

(a) a vessel **(21)** for receiving in its bottom portion said first medium;

(b) supply conduit means **(23, 25, 26; 48, 41, 44)** for supplying the second medium directly into said first medium beneath the level thereof, said first and second media having initial temperatures below and above the temperature of fusion of said first medium, respectively; and

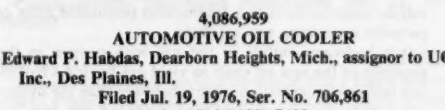
(c) by-pass conduit means **(31; 45)** for conducting said second medium in sealed relation through said first medium and for discharging said second medium above and immediately adjacent the upper surface of said first medium, whereby in the event said supply conduit means is closed, said second medium is brought into contact with said first medium via said by-pass conduit means.

4,086,959

AUTOMOTIVE OIL COOLER

Edward P. Habdas, Dearborn Heights, Mich., assignor to UOP Inc., Des Plaines, Ill.

Filed Jul. 19, 1976, Ser. No. 706,861
Int. Cl.² F28D *7/10*
U.S. Cl. 165—155 **11 Claims**



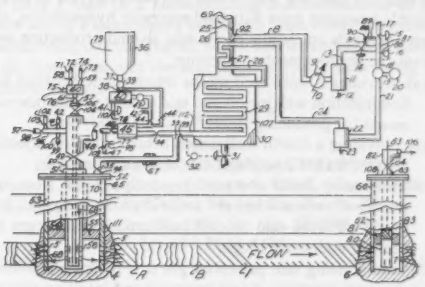
1. In a submerged oil cooler for automotive vehicles comprising a hollow inner length of tubing through which engine coolant may flow and an outer length of tubing sealed at its ends to the inner tubing and having an inner surface which cooperates with the outer surface of the inner length of tubing to define a generally annular flow passage for oil which may pass through inlet and outlet fittings at opposed ends of the cooler, the improvement wherein said inner length of tubing includes an integral, generally transversely helically finned outer surface along the major portion of its length and said outer length of tubing is helically corrugated over the major portion of its length to include root portions which are of an internal diameter slightly greater than the external fin diameter of the inner length of tubing and crest portions which are spaced from said fins, said fins being periodically longitudinally grooved around the circumference thereof, whereby the oil flowing through said flow passage will move generally longitudinally in a first path defined by said longitudinal grooves and generally helically in a second path defined by said helical corrugations.

4,086,960

APPARATUS FOR HYDROCARBON RECOVERY FROM EARTH STRATA

Charles A. Haynes, 3308 Tipps Dr., Nederland, Tex. 77627

Division of Ser. No. 538,591, Jan. 6, 1975, Pat. No. 3,986,556. This application Feb. 25, 1976, Ser. No. 661,325
Int. Cl.² E21B *43/24*
U.S. Cl. 166—59 **19 Claims**



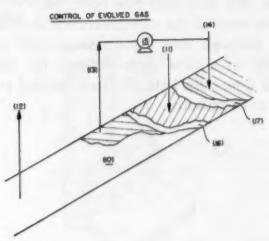
8. In an apparatus used to perform the process of catalytic stimulation of hydrocarbon recovery from porous and permeable hydrocarbon bearing strata in earth formations having at least one injection well and at least one production well each including a casing set and cemented through the same porous and permeable hydrocarbon bearing strata and perforated oppositely said hydrocarbon bearing strata, a well head at the upper end of said casings, tubing extending through said well heads hermetically sealing the annulus between said tubing and said casing in said injection and production wells, said tubing extending downwardly through said casing in said wells, the lower ends of said tubing are slotted oppositely said casing perforations and said hydrocarbon bearing strata, an adjustable packer adjacent the slotted section of said tubing hermetically sealing said annulus between said tubing and said casing in said injection and production wells, the upper end of said tubing in said injection well in communication with a block valve, a tubing manifold in communication with said block valve, a hydrocarbon cracking catalyst slurry supply pipe with block valve, a deionized water supply pipe and a block valve all in communication with said injection well tubing manifold, whereby said deionized water may be injected into said hydrocarbon bearing strata in order to displace salts which poison or deactivate the catalysts injected into said strata in the process of this invention.

4,086,961

METHOD OF OIL RECOVERY EMPLOYING ENRICHED GAS DRIVE WITH CONTROL OF EVOLVED GAS

William B. Braden, Jr., Houston, Tex., and George H. Agnew, Calgary, Canada, assignors to Texaco Inc., New York, N.Y. and Texaco Exploration Canada Ltd., Calgary, Canada

Filed Jan. 10, 1977, Ser. No. 758,268
Int. Cl.[2] E21B *43/20, 43/22*
U.S. Cl. 166—245 9 Claims



1. A method of oil recovery from a subterranean hydrocarbon-bearing dipping reservoir traversed by a first injection well means completed in the upper horizon of said reservoir and a second production well means completed in the lower horizon of said reservoir wherein a solvent that is gaseous at the reservoir conditions of temperature and pressure and conditionally miscible with the reservoir hydrocarbon is injected via said first injection well means into said reservoir to form a miscible transition zone with said reservoir hydrocarbon, and reservoir fluids are produced via said second production well means the improvement comprising:

(a) providing a third well means intermediate between said first injection well means and said second production well means for producing fluids from said reservoir,

(b) providing a fourth well means behind said first injection well means for injecting fluids into said reservoir,

(c) producing fluids comprising principally gas from said third well means when the ratio of produced gas to produced oil from said second production well means has become undesirably high,

(d) compressing said produced gas to a pressure above the reservoir pressure of said reservoir and injecting said gas into said reservoir via said fourth well means thereby providing a drive agent to displace said reservoir fluids through said reservoir toward said second production well means.

4,086,962

DECREASING HYDROGEN SULFIDE CONCENTRATION OF A GAS

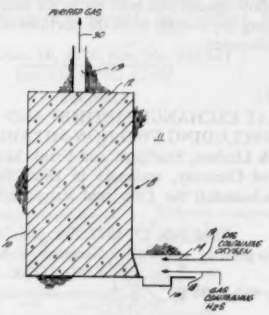
Chang Yul Cha, Bakersfield, Calif., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.

Filed Mar. 24, 1977, Ser. No. 780,924
Int. Cl.[2] E21B *43/24, 43/26;* E21C *41/10;* B01J *8/02*
U.S. Cl. 166—259 14 Claims

2. A method of decreasing hydrogen sulfide and total sulfur concentration of a gas comprising the steps of:

introducing a gas containing relatively higher hydrogen sulfide and total sulfur concentration to a fragmented permeable mass of oil shale, wherein at least a portion of the oil shale has been treated to remove organic material prior to introducing the gas to the oil shale;

reacting hydrogen sulfide in the gas with oxygen in the presence of the oil shale to yield gas having a hydrogen sulfide and total sulfur concentration relatively lower than the hydrogen sulfide and total sulfur concentration of the introduced gas; and



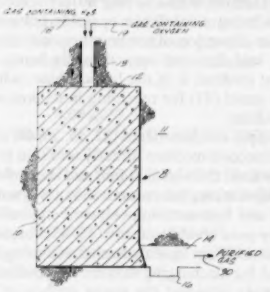
withdrawing such gas with relatively lower hydrogen sulfide and total sulfur concentration from the fragmented permeable mass of oil shale.

4,086,963

METHOD OF OXIDIZING HYDROGEN SULFIDE

Leslie E. Compton, Claremont, Calif., assignor to Occidental Oil Shale, Inc., Grand Junction, Colo.

Filed Mar. 24, 1977, Ser. No. 780,927
Int. Cl.[2] E21B *43/24, 43/26;* E21C *41/10;* B01J *8/02*
U.S. Cl. 166—259 18 Claims



2. A method of decreasing hydrogen sulfide concentration of a gas comprising the steps of:

introducing a gas containing relatively higher hydrogen sulfide concentration to a fragmented permeable mass of particles containing raw oil shale;

reacting hydrogen sulfide in the gas with oxygen in the presence of the raw oil shale to yield gas having a hydrogen sulfide concentration relatively lower than the hydrogen sulfide concentration of the introduced gas; and

withdrawing such gas having relatively lower hydrogen sulfide concentration from the fragmented permeable mass.

4,086,964

STEAM-CHANNEL-EXPANDING STEAM FOAM DRIVE

Richard E. Dilgren; George J. Hirasaki; Harold J. Hill, and Derrill G. Whitten, all of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

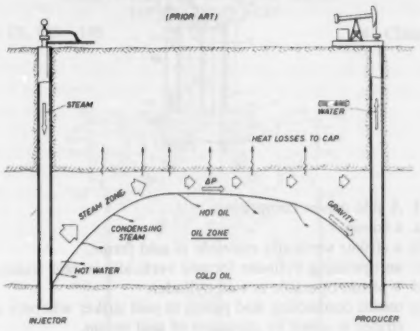
Filed May 27, 1977, Ser. No. 801,271
Int. Cl.[2] E21B *43/24*
U.S. Cl. 166—272 10 Claims

1. A process for recovering oil from a subterranean reservoir, comprising:

injecting steam and producing fluid at horizontally spaced locations within a portion of a viscous oil reservoir in which the disposition of a steam flow path is determined by the effect of gravity and/or oil distribution, rather than being substantially confined within only one or a few most permeable layers of reservoir rocks;

maintaining rates of steam injection and fluid production such that a steam breakthrough into a production location becomes at least substantially imminent and the extention of a steam channel from an injection location to a production location is at least substantially complete;

changing the composition of the fluid being injected from steam to a steam-foam-forming mixture consisting essentially of steam, noncondensable gas and an aqueous electrolyte-containing solution or dispersion of surfactant;



correlating the composition of the steam-foam-forming mixture with the properties of the rocks and fluids in the reservoir so that the pressure required to inject the mixture and the foam it forms or comprises into and through the steam channel exceeds that required for steam alone but is less than the reservoir fracturing pressure; and

adjusting the composition of the fluid being injected into the steam channel to the extent required to maintain a flow of both steam and foam within the channel in response to a relatively high pressure gradient at which the oil-displacing and channel-expanding effects are significantly greater than those provided by steam alone, without plugging the channel.

4,086,965

SOIL CULTIVATING IMPLEMENTS

Cornelis van der Lely, 7, Brüschenrain, Zug, Switzerland

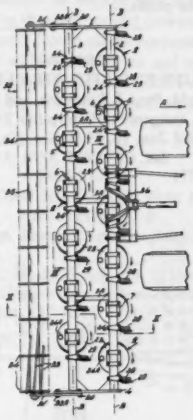
Filed May 20, 1976, Ser. No. 688,394

Claims priority, application Netherlands, May 21, 1975, 7505937

Int. Cl.[2] A01B *21/06*

U.S. Cl. 172—149 **12 Claims**

1. A soil cultivating implement comprising a frame and two rows of freely rotatable tined soil working members being mounted on said frame, a first of said rows being located in front of a second of said rows, with respect to the direction of normal travel, the soil working members in said two rows being rotatable about corresponding upwardly extending axes, the axes of rotation of those members in said first row extending substantially parallel to one another and being inclined towards one lateral side of the implement, the axes of rotation of those members in said second row extending substantially parallel to one another and being inclined towards the opposite lateral side of the implement, the axes of rotation of said soil working members being located in two planes that extend substantially perpendicular to the direction of implement travel, the distance between said two planes being substantially the same as the distance between the rotational axes of neighboring soil working members in either of said rows, and said distance being substantially twice the working width of each soil working member, a further soil working member being connected to said frame and rotatable about a substantially horizontal axis at the rear of said rows, said further member extending across the entire working width of said implement and being positioned closely adjacent the soil working members of said second row, at least one soil working member



being rotatably mounted on a sub shaft and said shaft depending from a base of a corresponding bracket secured at the lower side of a substantially horizontal beam of said frame, said bracket being channel-shaped with a base extending at an angle to the horizontal and the corresponding stub shaft being inclined to the vertical.

4,086,966

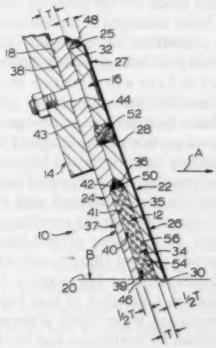
COMPOSITE GROUND ENGAGING TOOL

William E. Lanz, Joliet, and Harris S. Olson, Morton, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 20, 1976, Ser. No. 752,580

Int. Cl.[2] E02F *3/76*

U.S. Cl. 172—767 **4 Claims**



1. A composite ground engaging tool comprising:

a first plate having leading and trailing end portions, first and second substantially planar surfaces, and a cutting edge on the leading end portion;

a second plate having leading and trailing end portions, first and second substantially planar surfaces, and a cutting edge on the leading end portion, the plates being substantially coextensive and of a construction sufficient for spacing the leading end portions from each other during

contacting of the first planar surfaces and defining a deep slot and an inwardly defined base of the slot therebetween;

means connecting the plates together with the first planar surfaces contacting one another, said means including at least one internal weld joint located at said base of the slot and spaced from said second planar surfaces; and

a wear-resistant member disposed within the slot and secured to the plates.

4,086,967

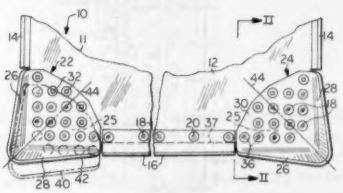
EXTENDED LIFE END BITS FOR BULLDOZER BLADES

Larry G. Eftefield; Paul J. Lukavich, and Roger R. Mitchell, all of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Jun. 16, 1976, Ser. No. 697,080

Int. Cl.[2] E02F *3/76, 3/80*

U.S. Cl. 172—777 **1 Claim**



1. A reversible end bit for selective mounting to an earthworking blade having opposite corner portions, said bit comprising a one-piece rigid member having a first cutting edge portion, a second cutting edge portion extending transversely to said first cutting edge portions, and a mounting portion included between said cutting edge portions and adapted to be mounted to one corner portion of a blade with said mounting portion facially abutting the blade and said first cutting edge portion in forwardly projecting cutting position, and to the opposite corner portion of the blade with said mounting portion turned approximately 90° and facially abutting the blade and the second cutting edge portion in forwardly projecting cutting position, said bit member being substantially symmetrical about a centerline bisecting the angle defined by said cutting edge portions and said mounting portion, said bit member mounting portion defining a plurality of bolt mounting holes arranged in a preselected pattern symmetrically of said centerline, each of said blade corner portions defining a plurality of bolt mounting holes arranged in a preselected pattern symmetrically of said centerline, each of said blade corner portions defining a plurality of bolt mounting holes arranged in a pattern preselected to have a first portion thereof aligned with a first group of said bit mounting holes with the bit member disposed in a first adjusted position on one of said blade corner portions, a second portion thereof aligned with a second group of said bit mounting holes with the bit member disposed in a second adjusted position on said one of said blade corner portions, a third portion thereof aligned with a third group of said bit mounting holes with the bit member disposed in a third adjusted position on the other of said blade corner portions, and a fourth portion thereof aligned with a fourth group of said bit mounting holes with the bit member disposed in a fourth adjusted position on said other of said blade corner portions, said bit bolt mounting holes being arranged in a rectangular grid pattern defined by horizontal and vertical rows extending from a holeless corner position with the first horizontal row having bolt mounting holes in each of the second, third, fourth and fifth vertical rows, the second horizontal row having bolt mounting holes in each of the first, second, third and fourth vertical rows, the third horizontal row having bolt mounting holes in each of the first, second, third and fourth vertical rows, said fourth horizontal row having bolt mounting holes in each of the first, second, and third vertical rows, and said fifth horizontal row having a bolt mounting hole in the first vertical row.

4,086,968

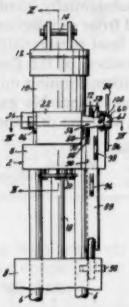
PILE DRIVER

George C. Wandell, Overland Park, Kans., assignor to Conmaco, Inc., Kansas City, Kans.

Filed Feb. 9, 1977, Ser. No. 766,924

Int. Cl.[2] B25D *9/00*

U.S. Cl. 173—115 **2 Claims**



1. A pile driver comprising:

a. a frame,

b. a striker vertically movable in said frame,

c. an operating cylinder formed vertically in said frame,

d. a piston operable in said cylinder,

e. means connecting said piston to said striker whereby said striker is raised by elevation of said piston,

f. a valve chamber formed in said frame,

g. a two-position valve member mounted movably in said valve chamber,

h. first and second passageways formed in said cylinder and connecting said valve chamber respectively to said cylinder beneath said piston and to atmosphere,

i. means for supplying pressurized fluid to said valve chamber, said valve member having a first position delivering said fluid to said first passageway, whereby said piston is elevated, and a second position interconnecting said first and second passageways, whereby fluid beneath said piston is exhausted to atmosphere and said piston is released,

j. a valve stem affixed to said valve member and projecting from said valve chamber in a direction transverse to the direction of movement of said piston, and operable by turning thereof in relatively opposite directions to move said valve member between its first and second positions,

k. a cam bar carried slidably by said frame for longitudinal movement parallel to the movement of said piston, affixed at one end to said striker to be movable therewith, and extending transversely past said valve stem in spaced relation therefrom,

l. a first cam follower mounted non-rotatably on said valve stem and projecting radially therefrom,

m. a first cam fixed on said cam bar and operable to engage and deflect said first follower as said piston approaches the bottom of its stroke, whereby to turn said valve stem to move said valve member to its first position,

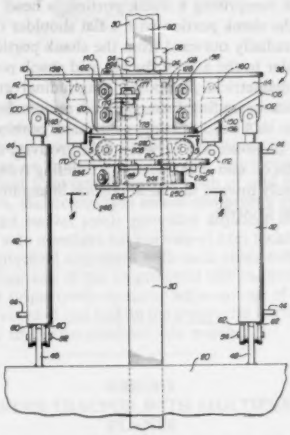
n. a second cam follower mounted non-rotatably on and for axial sliding movement along said valve stem,

o. second and third cams fixed on said cam bar in transversely spaced relation thereon and operable to engage and deflect said second follower, whereby to turn said valve stem to move said valve member to its second position, at respectively different elevations of said piston, the cam actually engaging said second follower depending on the position of said second follower longitudinally along said valve stem,

p. a fluid pressure control cylinder mounted on said frame coaxially with said valve stem,

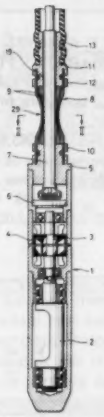
q. an extension fixed to said second follower and projecting coaxially therefrom into said control cylinder,
r. a piston operable in said control cylinder and affixed to the extended end of said follower extension, and
s. remotely operable means operable to supply pressurized fluid to said control cylinder selectively at either side of the piston therein, whereby said second cam follower may be shifted selectively into operative alignment either with said second cam or said third cam.

4,086,969
CROWD FOR KELLY BAR
William E. Jarrett, West Sacramento, Calif., assignor to Zonver Jarrett Foundation Drilling Co., Inc., Sun Valley, Calif.
Filed Nov. 18, 1976, Ser. No. 742,909
Int. Cl.[2] B23Q *5/00*
U.S. Cl. 173—149 **16 Claims**



1. In a heavy duty drilling machine,
a generally vertical kelly bar adapted for rotation and having drilling means on its lower end, said kelly bar being a rectangular prism,
a boring head of a drilling machine adapted to receive said kelly bar therethrough and to rotate the kelly bar,
a crowd frame above said boring head supported by first hydraulic rams having upper ends connected to the frame and lower ends connected to the boring head,
a crowd supported vertically in said frame so as to be associated with said kelly bar,
the improvement comprising:
means supported by the crowd frame to engage the crowd with the kelly bar to transfer the entire weight of the drilling machine and crowd frame onto the kelly bar to increase the down pressure on the drilling means,
said means to engage being adapted to disengage the crowd from the kelly bar,
said means to engage including cams and cam followers,
said crowd including two elongated plates extending vertically on opposite sides of said prism, and being movable horizontally by said cams and cam followers,
said plates being horizontally spaced from said two opposite sides when disengaged and being in gripping contact with said two opposite sides when engaged,
said cam followers being two plates, each being secured to a respective said elongated plate outwardly thereof,
said cam followers tapering downwardly so as to have outer faces thereof a greater horizontal distance from said elongated plates at their lower ends than at their upper ends,
said cams being two cam rollers, each being positioned outwardly of and adjacent a respective outer follower face,
said cams being supported by means including a non-rotating lower frame member of said crowd frame,
means supporting said lower frame member in said crowd frame and being adapted to move said lower frame member and said cams upwardly and downwardly,
said cams being adapted to be rotated with the kelly bar,
said cams being adapted to engage said follower faces in pressure contact as they are moved downwardly so as to move said elongated crowd plates horizontally into gripping engagement with said kelly bar and said cams being adapted to be disengaged from said follower faces as they are moved upwardly so as to free said crowd plates from said kelly bar.

4,086,970
VIBRATION ABSORBING DEVICE FOR PORTABLE VIBRATORS
Hiroshi Kato, Ashikaga, Japan, assignor to Sakura Denki Kabushiki Kaisha, Japan
Filed Dec. 16, 1976, Ser. No. 751,436
Claims priority, application Japan, Apr. 23, 1976, 51-45328
Int. Cl.[2] E21B *3/00*
U.S. Cl. 173—162 **5 Claims**



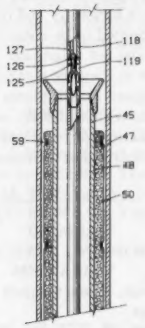
1. A vibration absorbing device comprising:
a machine body incorporating a source of rotational vibration;
a handle for holding the machine while in use; and
a vibration absorbing joint coupling said machine body to said handle, said joint comprising a plurality of elastic bars (9) arranged about and spaced from an axis, said bars being spaced from each other and forming a generally cylindrical bird cage-like basket around said axis, said bars having a wavy or corrugated shape along the lengths thereof and defining at least one ridge (29;39) on a plane which includes the radial and axial directions of said cylindrical basket, said bars having their ridges in radial directions and being fixed at opposite ends of said cylindrical basket to said machine body and to said handle, respectively.

4,086,971
RISER PIPE INSERTS
Johnce E. Hall, Broken Arrow, and William D. Greenfield, Tulsa, both of Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.
Filed Sep. 15, 1976, Ser. No. 723,400
Int. Cl.[2] E21B *15/02*
U.S. Cl. 175—7 **6 Claims**

1. An apparatus, for use with a drilling vessel floating on a

body of water, in which a drilling mud is circulated which comprises:

a riser pipe connected between said drilling vessel and a subsea wellhead;



a sleeve insert in said riser pipe, the density of said sleeve insert being not greater than that of said water supporting said vessel; and

means for holding said sleeve insert in place.

4,086,972

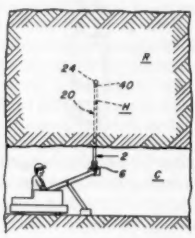
METHOD AND APPARATUS FOR ROOF DRILLING

Lloyd B. Hansen, Bridgeport, and Eugene R. Smarrella, Shinnston, both of W. Va., assignors to Carmet Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 683,986, May 6, 1976, Pat. No. 4,009,760, which is a continuation of Ser. No. 554,878, Mar. 3, 1975, abandoned. This application Jan. 21, 1977, Ser. No. 760,898

Int. Cl.[2] **E21C** *13/01, 13/02, 15/00, 15/02*

U.S. Cl. 175—65 **15 Claims**



1. In a roof drilling assembly comprising a starter-driver bar including a first end adapted to be driven by a motor and a second end having a female socket therein, a rod extension having a male end shaped to be received in said female socket and a female socket at its other end of the same cross-sectional size and shape as the first named female socket, and a bit having a male shank of the same general cross-sectional shape as said male end and a head portion, said sockets, male end and shank being noncircular in transverse cross-section, each of said starter-driver bar and rod extension having an axial hole therethrough; the improvement comprising at least one longitudinal groove in the outer surface of said bit shank extending from the end remote from said head portion to a point beyond the socket when the bit is in said socket.

8. The method of drilling a hole in a mine chamber roof to a greater depth than the height of the chamber below the roof which comprises providing a starter-driver bar including a first end adapted to be driven by a motor and a second end having a female socket therein, a plurality of rod extensions each having a male end shaped to be received in said female socket and a female socket at its other end of the same cross-sectional size and shape as the first named female socket, a bit having a male shank of essentially the same cross-sectional shape as said male end and having at least one longitudinal groove in its outer surface extending from its lower end to a point beyond said socket, each of said starter-driver bar and rod extensions having an axial hole therethrough, securing the bit shank in the female socket of said starter-driver and connecting the first end of the starter-driver to said motor to provide a first assembly, then drilling a hole in said roof with said first assembly while passing water from the bottom of said starter-driver through said axial hole therein and discharging the water through said longitudinal groove, then separating said bit from said starter-driver, then securing the bit in the female socket of a first rod extension and the male end of said first rod extension in the socket of said starter-driver, and then continuing drilling said hole while supplying water to the bottom of said starter-driver bar.

14. A bit comprising a shank portion, a head portion connected to the shank portion with a flat shoulder therebetween extending radially outward from the shank portion in a plane perpendicular to the axis of the bit, said shank portion having a pair of diametrically opposed longitudinal grooves in its outer surface extending from the end remote from the head portion into said head portion, said shank portion being noncircular in cross-section between said grooves, and a pair of tapered sides on said shank portion extending from said remote end outwardly toward said head portion in alignment with said longitudinal grooves.

4,086,973

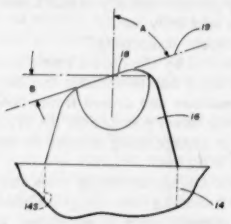
ASYMMETRIC INSERT FOR INNER ROW OF AN EARTH BORING CUTTER

Wilbur S. Keller, Arlington, and James Wilson Langford, Jr., Red Oak, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Dec. 3, 1976, Ser. No. 747,446

Int. Cl.[2] **E21B** *9/08*

U.S. Cl. 175—374 **2 Claims**



1. In a rotary rock bit having at least one rolling cutter member for forming a borehole in the earth, said rolling cutter member having at least one annular inner row of inserts mounted in sockets in the cutter member for cutting the inner portions of the borehole, the improvement comprising:

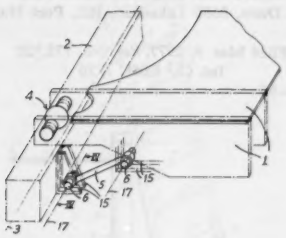
said inserts having an asymmetric shape prior to assembly in the sockets that includes extended formation contacting crests said crests being substantially parallel to the inner portions of the borehole being cut and extending at acute angles to the axes of said inserts.

4,086,974

CHASSIS FOR VEHICLE

Jean-Claude Emile Leclerc, Meaux-Beauval, France, assignor to Poclain, Le-Plessis-Belleville, France

Filed Oct. 14, 1976, Ser. No. 732,434
Claims priority, application France, Oct. 28, 1975, 75 32954
Int. Cl.[2] B62D *55/00*
U.S. Cl. 180—9.5 4 Claims



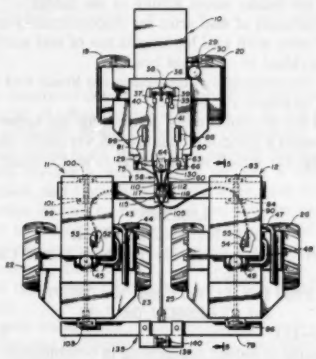
1. A chassis for a vehicle intended for supporting heavy loads, comprising two parallel longitudinal side members, a transverse frame extending between said side members, connection means on opposite sides of said transverse frame for connecting said transverse frame to each of said longitudinal side members, said connection means comprising two longitudinally spaced swivel joints provided adjacent each of said longitudinal side members having swivel axes located substantially in longitudinal alignment with each other and parallel to the longitudinal axis of the longitudinal side members and two tie-rods each respectively mounted adjacent one of said swivel joints and pivoted at one end on the transverse frame and on an opposite end to the longitudinal side member.

4,086,975

ARTICULATED TRACTOR WITH MULTIPLE POWER PLANTS

Paul A. Nystuen, Longmont, Colo., assignor to Steiger Tractor Inc., Fargo, N. Dak.

Filed Nov. 30, 1976, Ser. No. 746,156
Int. Cl.[2] B62D *59/04, 61/00*
U.S. Cl. 180—14 R 9 Claims



1. An articulated tractor comprising first, second, and third tractor vehicles each having a rotatable axle, a pair of ground engaging driving elements coupled to said axle adjacent opposite ends thereof, and an engine drivingly connected to said axle to drive said driving elements, said first tractor vehicle also having an operator's compartment,

a cross bar extending transversely of the longitudinal axes of said first, second and third tractor vehicles,

first pivotal means pivotally securing said cross bar adjacent the longitudinal midpoint thereof to the rear of said first tractor vehicle for pivotal movement both about a generally vertical axis and about a generally horizontal axis,

second and third pivotal means securing said second and third tractor vehicles at the front thereof to said cross bar at points equally spaced from said first pivotal means so that the longitudinal axes of said second and third tractors are normally substantially parallel to each other,

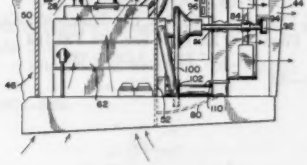
and steering means including a steering control in the operator's compartment of said first tractor vehicle for changing the angular relationship of said cross bar to said first tractor vehicle to cause the longitudinal axes of said second and third tractor vehicles to assume temporarily an angular relationship with the longitudinal axis of said first tractor vehicle.

4,086,976

ISOLATED CLEAN AIR CHAMBER AND ENGINE COMPARTMENT IN A TRACTOR VEHICLE

Charles H. Holm, Plainfield, and William L. Schubert, Downers Grove, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Feb. 2, 1977, Ser. No. 765,163
Int. Cl.[2] B60K *11/04*
U.S. Cl. 180—54 A 8 Claims



1. In a tractor vehicle having a frame to which the vehicle engine and the engine coolant heat exchanger are mounted, a chambered engine compartment comprising:

a first enclosure surrounding the vehicle engine having an opened bottom and a plurality of apertures including a muffler shroud accompanying aperture and an exhaust duct accompanying aperture;

a second enclosure housing an engine coolant heat exchanger;

an engine driven fan located outboard of said heat exchanger for drawing air through said second enclosure housing and through said heat exchanger;

an exhaust duct having a first end connected to said exhaust duct accompanying aperture and a second end located on the fan side of said heat exchanger between said heat exchanger and said fan whereby said fan may draw air from said duct and propel it forward out the front of said tractor vehicle.

4,086,977

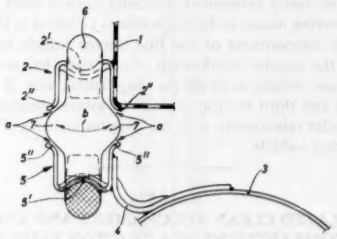
SUSPENSION INSTALLATION FOR AN EXHAUST GAS SYSTEM

Hans Heiland, Munich, and Otto Seyfferle, Oberschleissheim, both of Germany, assignors to Bayerische Motoren Werke Aktiengesellschaft, Germany

Filed Sep. 21, 1976, Ser. No. 725,342
Claims priority, application Germany, Sep. 23, 1975, 2542272
Int. Cl.[2] B60K *13/04*
U.S. Cl. 180—64 A 16 Claims

1. Suspension installation for an exhaust device in a motor vehicle with a body, which comprises first support means

substantially rigidly mounted at the vehicle body and second support means rigidly mounted at the exhaust device, and support ring means of elastic material operatively connecting said first and second support means in spaced relation, characterized in that the cross section of the support ring means in the area between the first and second support means has at least



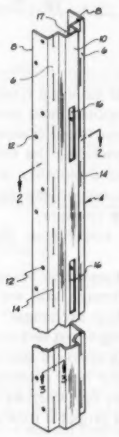
one cross section enlargement, and each support means is provided with abutment means which are so arranged that upon motion of the exhaust device crosswise to the plane of the support ring means they cooperate with the cross section enlargement of the support ring means to elastically limit the motion of the exhaust device crosswise to the plane of the support ring means.

4,086,978

BUILT-IN SCAFFOLD SUPPORT

Lawrence H. Clements, P.O. Box 134, Humboldt, Kans. 66748

Filed Oct. 22, 1976, Ser. No. 735,108
Int. Cl.[2] E04G *3/08, 9/00*
U.S. Cl. 182—82 **7 Claims**



7. A scaffold support for use during the construction of a sheathed wood frame structure and which remains as a part of the structure, comprising:

a formed metal channel, having a pair of flanges, of a size to fit around a part of two sides of a vertical member of the wood frame;

means for fastening the formed metal channel to the vertical member of the structure;

a rib, adjacent to one flange, protruding outwardly from the channel and having a plurality of vertical slots;

a recess, enclosed by the rib and the vertical member of the wood frame, accessible through the slot;

a web extending from the rib in abutting relation with said vertical member to the flange on the opposite side and providing a support for the sheathing;

means for fastening the sheathing, through the web, to the vertical member; and

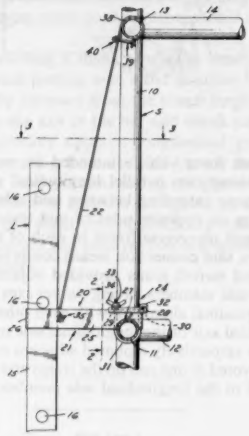
means for supporting a removable scaffold platform from the slot in the web.

4,086,979

SCAFFOLD LADDER ADAPTER

Lehmann M. Dunn, 5690 Lakeshore Rd., Port Huron, Mich. 48060

Filed Mar. 9, 1977, Ser. No. 775,726
Int. Cl.[2] E06C *1/36*
U.S. Cl. 182—93 **13 Claims**



1. The combination comprising

a scaffold having a plurality of vertically spaced horizontal bars,

a ladder having horizontal rungs and vertically spaced uprights,

and a scaffold ladder adapter comprising a bracket having spaced arms connected by a base positioned on each upright of the ladder under a rung of the ladder,

means on the ends of said arms for disconnectably connecting said arms with said horizontal bar of said scaffold,

a strap individual to each said bracket,

means for disconnectably connecting the lower end of each strap to its respective bracket,

and means for disconnectably connecting the upper end of each strap to a horizontal bar spaced vertically above the horizontal bar which is connected to said bracket.

4,086,980

DISMANTLING LADDER

Lois E. Shortes, and Joan A. Shortes, both of 603 Canal St., Placerville, Calif. 95667

Filed Feb. 11, 1977, Ser. No. 767,779
Int. Cl.[2] E06C *1/08, 7/50*
U.S. Cl. 182—151 **5 Claims**

1. A dismantable ladder comprising in combination:

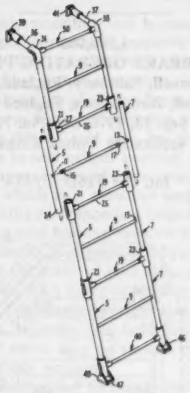
a. a plurality of pairs of rails, each pair comprising a large rail and a small rail, said small rail being of a size to telescope inside a large rail,

b. a plurality of removable rungs, each removable rung being of a size to telescope inside a small rail,

c. complementary holes in said rails to receive said rungs, and

d. a plurality of connector elements, each connector element including a fixed rung with a double socket affixed to each

end thereof, each of said double sockets having a first opening facing up and a second opening facing down, the sockets on one end having openings to receive a large rail



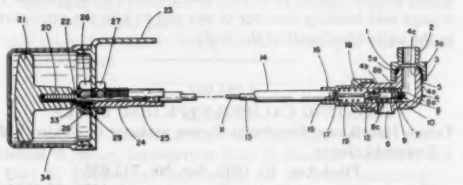
and on the opposite end to receive a small rail, and a barrier with each of said sockets to prevent a rail from passing completely through the socket.

4,086,981

DRAIN DEVICE FOR OIL PANS

Hiroyasu Mitsui, No. 24-9, Amanuma 1-chome, Suginami-ku, Tokyo, Japan

Continuation of Ser. No. 586,760, Jun. 13, 1975, abandoned.
This application Oct. 18, 1976, Ser. No. 733,447
Claims priority, application Japan, Mar. 31, 1975, 50-43311[U]
Int. Cl.[2] F01M *11/04*
U.S. Cl. 184—1.5 **4 Claims**



1. An improved device for draining fluid such as oil from the drain outlet of a fluid reservoir such as an oil pan for an engine of an automobile or similar vehicle, comprising:

a main valve body including a tubular body, said tubular body having a vertical tube section, a horizontal tube section, and a juncture therebetween, said vertical tubular section having an upper end and a lower end, the upper end including means for connecting to said drain outlet and the lower end being joined to the horizontal tube section by the juncture, so that the vertical tube section and the horizontal tube section define a fluid flow drain path;

said main valve body further including a valve seat formed within the horizontal tube section, said valve seat having a truncated conical surface with a narrow end adjacent said juncture and a wide end away from said juncture;

an outlet port formed in the horizontal tube section and projecting downwardly to define a tap, said outlet port having a smoothly tapered cross section, a lower port end and an upper port end, said lower port end having a larger diameter than said upper port end, said outlet port being offset horizontally from the juncture;

a valve member slidably mounted in the horizontal tube section, said valve member including an annular thin wall portion, a truncated cone portion and pointed cone-shaped portion, said truncated cone portion being interposed between said annular thin wall portion and said pointed cone-shaped portion, said truncated cone portion defining an annular groove for accommodating an O-ring, said valve member being slidable from a sealed position wherein said pointed cone-shaped portion projects through said valve seat toward said juncture and wherein said truncated cone portion fits against said valve seat and wherein said thin wall portion fits over said tap, to an open position wherein said fluid flow drain path is open to said tap;

a biasing spring projecting into said thin wall portion for exerting a biasing force to bias the valve member to the sealed position; and

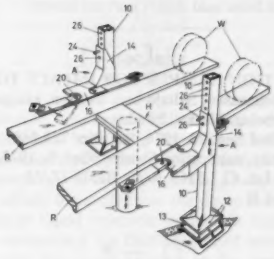
moving means for moving the valve member against the biasing force from the sealed position wherein the valve prevents fluid flow, to the open position wherein fluid can flow into the horizontal tubular section, past the valve seat and out the outlet port, said moving means including a flexible cable and a knob, said flexible cable having a first end and a second end, said first end being attached to the valve member and said second end being attached to the knob, said knob being disposed at a position remote from the valve member and near to the driver of the vehicle, said moving means also including means for retaining the valve member in the open position.

4,086,982

APPARATUS FOR SUPPORTING AN AUTOMOBILE AT AN ELEVATION

Jack Frank Hernick, 6 Carousel Court, Toronto, Ontario, Canada (M6B 3M1)

Filed Nov. 2, 1976, Ser. No. 738,022
Int. Cl.[2] B66F *7/18*
U.S. Cl. 187—8.54 **7 Claims**



1. Vehicle hoist and support apparatus

comprising means for engaging a vehicle by its undercarriage;

a central elevator operable to raise and lower said vehicle engaging means together with the vehicle engaged thereby;

a pair of posts installable adjacent to the hoist and on opposite sides thereof;

cantilever assemblies respectively disposable on and securable to each said post at selected elevations for intercepting a vehicle being lowered on said vehicle engaging means and detaining and holding it aloft while the vehicle engaging means is thereafter lowered, free of the vehicle to a neutral out-of-the-way position;

a flange forming part of each said cantilever assembly extending towards said hoist, and

means for releasably interengaging said cantilever assemblies with said vehicle engaging means to be raised thereby to said selected elevation when the vehicle is

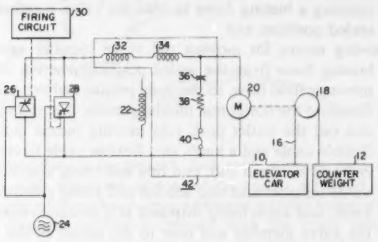
raised, said means comprising spurs extending from said vehicle engaging means to underlie said flanges.

4,086,983

ELEVATOR CONTROL SYSTEM

Nobuo Anzai, and Eiki Watanabe, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 6, 1975, Ser. No. 602,310
Claims priority, application Japan, Aug. 27, 1974, 49-98699
Int. Cl.[2] H02K *27/28*
U.S. Cl. 187—29 R **2 Claims**



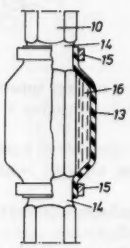
1. An elevator control system comprising a direct current motor including an armature and a selected one of an interpole winding and a series field winding serially connected to said armature to operate an elevator car, static Ward-Leonard means coupled to said motor for controlling said motor, said static Ward-Leonard means being capable of generating current ripples, and series resonance filter means having a resonance frequency at least extremely close to the fundamental frequency of said current ripples from said static Ward-Leonard means, said series resonance filter means being connected across said armature of said direct current motor to reduce noise produced from said direct current motor.

4,086,984

VIBRATION DAMPER FOR IMPACT TOOL

Folke Ingvar Johansson, Saltsjo-boo, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Sep. 22, 1976, Ser. No. 725,565
Claims priority, application Sweden, Oct. 9, 1975, 7511305
Int. Cl.[2] F16F *9/10*; B25D *17/12*
U.S. Cl. 188—1 B **12 Claims**



1. In an impact tool comprising an elongated working part (**10**; **20**; **30**) which includes a shank portion (**11**; **21**; **31**) for connection to an impact machine, a working end (**12**; **22**; **32**) and a collar (**18**; **28**; **38**) intermediate said shank portion and working end, said impact tool transmitting impact energy in its axial direction,

a vibration damper for damping lateral vibrations in said impact tool, comprising:

an envelope (**13**; **23**; **33**) surrounding a portion of the working part of the tool intermediate said collar and working end; and

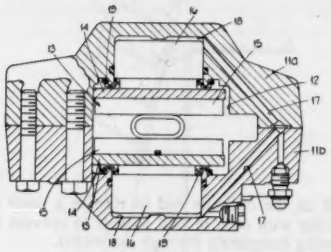
a liquid-like material (**16**; **26**; **36**) enclosed within said envelope for damping lateral vibrations of said working part.

4,086,985

DISC BRAKE OPERATING PISTON

Michael Derek Cunnell, Salisbury, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Sep. 13, 1976, Ser. No. 722,404
Claims priority, application United Kingdom, Sep. 18, 1975, 38373/75
Int. Cl.[2] F16D *55/18*
U.S. Cl. 188—72.4 **6 Claims**



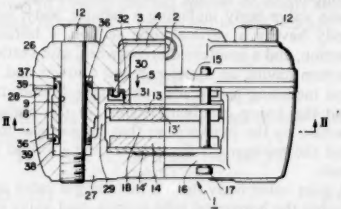
1. An operating piston for a disc brake including a backing member supporting a friction pad, the piston consisting essentially of a cylindrical body which is formed with a blind bore therein such that said body is open at one end of and closed at its opposite end by a shallow integral base member, the body being formed of a synthetic resin material, and a projection upstanding from said base member and also formed of a synthetic resin material, said upstanding projection being fixed relative to the base member and including a plurality of ribs which extend axially from the base member to a position to engage said backing member in use and to join the projection to the cylindrical wall of the body.

4,086,986

FLOATING CALIPER-TYPE DISC BRAKE

Tetsuo Haraikawa, Funabashi, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Aug. 10, 1976, Ser. No. 713,035
Claims priority, application Japan, Aug. 14, 1975, 50-98826
Int. Cl.[2] F16D *55/224*
U.S. Cl. 188—73.3 **1 Claim**



1. In a floating caliper disc brake including:

a pair of brake pads for respectively engaging corresponding zones on opposite sides of a disc to be braked;

a fixed support having a pair of spaced arm portions each provided with a hole therethrough;

a housing having a pair of spaced caliper portions and intermediate spacing structure therebetween presenting a chamber therewithin for receiving said pads;

a pair of bolts in tension extending between said caliper portions and arranged for passing through said holes of said support for holding said caliper portions toward each other;

means for shiftably mounting said housing on said support with said caliper portions on opposite sides of said disc and for transmitting lateral forces exerted upon said housing during braking to said structure;

means for mounting each of said pads upon a corresponding caliper portion in facing relationship to said zone of the corresponding side of said disc for the transmission of braking torque to said caliper portion; and

means for shifting one of said pads relative to the caliper portion upon which it is mounted and into forceful engagement with the corresponding zone of said disc and for thereby shifting said housing relative to said support and shifting the other of said pads into opposing forceful engagement with the other of said zones of said disc;

the improvement of which brake comprises:

said holes being of substantially larger transverse dimensions than said bolts, whereby said bolts pass loosely through said holes and serve only as tension members interconnecting said caliper portions,

said housing mounting and force-transmitting means being structurally and functionally independent of said bolts and said holes,

said housing mounting and force-transmitting means comprising guide projection means on said support adjacent said holes slideably received within cooperating guide cavity means in said housing adjacent said bolts,

said cavity means including a cylindrical cavity in each of said caliper portions respectively for each of said bolts respectively, each of said cavities having its inner surface substantially coaxial with the corresponding bolt and spaced away from the latter,

said projection means including a pair of cylindrical sleeve-like structures extending oppositely from the opposite sides of said support for each of said holes respectively, each of said structures having its inner surface loosely circumscribing the corresponding bolt and its outer surface slideably received in the corresponding cavity of the adjacent caliper portion,

said projection means being formed as integral portions of said support.

4,086,987

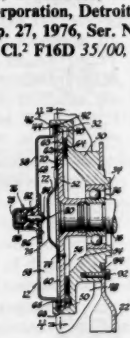
VISCOUS FLUID CLUTCH

Michael W. Riley, Strongsville; Lane S. Duncan, Westlake, and Carl E. Bochmann, Brecksville, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 27, 1976, Ser. No. 726,606

Int. Cl.[2] F16D *35/00, 43/25*

U.S. Cl. 192—58 B **5 Claims**



1. A viscous fluid clutch comprising a drive shaft having an axis of rotation, a clutch housing rotatably mounted on said drive shaft and having an operating chamber and a reservoir chamber generally symmetrical about the axis of the shaft, divider means between said operating and reservoir chambers and including a clutch plate secured to said drive shaft and having a fluid shear space bounded by interdigitated annular elements formed in adjacent surfaces of said clutch plate and housing in said operating chamber and operable with a fluid medium to provide a shear-type fluid drive between said clutch plate and said housing, outlet and inlet means formed at respective radially outer and inner portions of said divider means, pump means operatively connected to said divider means for pumping said fluid medium from said operating chamber through said outlet means to said reservoir chamber, a radially extending, resilient flexible valve member secured at one end thereof to said divider means on the reservoir chamber side thereof and having a free end portion resiliently urged towards a closed position on said inlet means, and temperature responsive, axially movable power means mounted on said housing and extending into said reservoir chamber for at times contacting and distorting an intermediate portion of said valve member to thereby move the free end portion away from said inlet means to control the flow of said fluid medium therethrough from said reservoir chamber to said operating chamber in response to changes in ambient temperature.

4,086,988

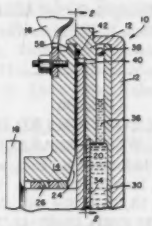
ROLLING DAM TEMPERATURE CONTROLLED HYDRAULIC COUPLING

Henry Joseph Spence, Indianapolis, Ind., assignor to Wallace Murray Corporation, New York, N.Y.

Filed Nov. 15, 1976, Ser. No. 741,699

Int. Cl.[2] F16D *35/00, 43/25*

U.S. Cl. 192—58 B **3 Claims**



1. A hydraulic coupling including a drive rotor within a drive chamber in a housing, a shear liquid within the drive chamber, a dam carried by the housing, the dam being contiguous to the periphery of the rotor, a passageway in the housing extending radially inwardly from the dump hole adjacent the dam to a shear liquid reservoir within the housing, the improvement comprising, the dam positioned within a cage for limited angular movement relative to the periphery of the drive disc between one position on one side of the dump hole and a second position at the other side of the dump hole, whereby the dam is automatically positioned relative to the dump hole by virtue of rotation of the drive rotor relative to the coupling housing, shear liquid carried by the drive rotor periphery striking the dam and automatically moving it to its proper position.

4,086,989

TEMPERATURE CONTROLLED HYDRAULIC COUPLING WITH MOVEABLE DAM

Henry Joseph Spence, Indianapolis, Ind., assignor to Wallace Murray Corporation, New York, N.Y.

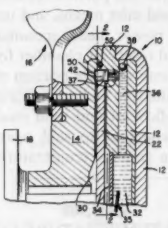
Filed Nov. 15, 1976, Ser. No. 741,712

Int. Cl.[2] F16D *35/00, 43/25*

U.S. Cl. 192—58 B **4 Claims**

1. A hydraulic coupling including a drive rotor within a drive chamber in a housing, a shear liquid within the drive chamber, a dam carried by the housing, the dam being adjacent the periphery of the rotor, a passageway in the housing extending radially inwardly from a dump hole adjacent the dam, to a

shear liquid reservoir within the housing, the improvement comprising, the dam having two liquid abutment faces and being rotatably attached to the housing so as to assume either of two fixed angular positions with respect to the housing, the dump hole being adjacent one face of the dam in one said fixed angular position and being adjacent the other face of the dam in the said other said fixed angular position, whereby the dam may be positioned in one or the other of its two fixed angular positions at the place of assembly of the hydraulic coupling so as to accommodate either clockwise or counter-clockwise



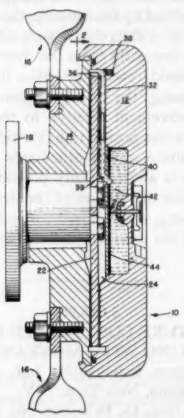
mode of relative rotation between the drive rotor and the housing, the shear liquid carried by the drive rotor periphery striking one face of the dam in one angular position of the dam and at least a portion thereof being deflected and entering the dump hole for return to the shear liquid reservoir in one mode of relative rotation, the shear liquid striking the other face of the dam in the other fixed angular position of the dam and at least a portion thereof being deflected and entering the dump hole for return to the shear liquid reservoir in the other mode of relative rotation.

4,086,990

TEMPERATURE CONTROLLED HYDRAULIC COUPLING WITH SEPARATE TUBE

Henry Joseph Spence, Indianapolis, Ind., assignor to Wallace Murray Corporation, New York, N.Y.

Filed Nov. 15, 1976, Ser. No. 741,700
Int. Cl.[2] F16D *35/00, 43/25*
U.S. Cl. 192—58 B **5 Claims**



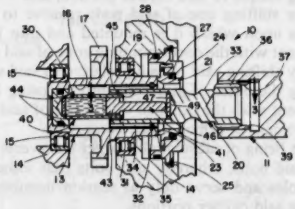
1. A fluid coupling being of the type having a drive rotor adapted to be rotatably connected with respect to the drive rotor, the housing having a drive chamber receiving the drive rotor, shear liquid in the drive chamber, a shear liquid reservoir carried by the housing, a dam in the housing adjacent the periphery of the drive rotor, a radially extending shear liquid passageway from adjacent the dam to the liquid reservoir, the improvement comprising, the said radially extending passageway defined by a separate tube.

4,086,991

THERMALLY ACTUATED DISCONNECT COUPLING

Gerald L. Swadley, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 14, 1976, Ser. No. 732,249
Int. Cl.[2] F16D *43/25*
U.S. Cl. 192—82 T **10 Claims**



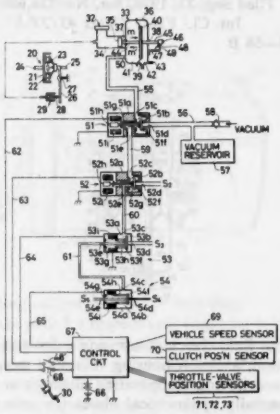
1. In a thermally actuated disconnect coupling including a coupling shaft normally connected between drive and driven members to transmit torque from one of said members to the other, and an element for supporting said shaft against axial movement during normal in-service use of said coupling and being formed of a material adapted to give way generally at a preselected temperature to allow said shaft to move axially thereby disconnecting said drive and driven members, the improvement in said coupling comprising normally mating helical splines formed on said coupling shaft and one of said members to transmit the torque from said drive member to said driven member, said splines being helically slanted in a direction so as to urge said coupling shaft toward said element when torque is being transmitted by said coupling shaft in the normal direction of rotation of said shaft.

4,086,992

CLUTCH CONTROL APPARATUS FOR AUTOMOTIVE DRIVELINE

Hideo Hamada, and Masanori Mizote, both of Yokosuka, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Jun. 11, 1976, Ser. No. 694,950
Claims priority, application Japan, Jun. 13, 1975, 50-72481
Int. Cl.[2] B60K *21/00*
U.S. Cl. 192—.076 **6 Claims**



1. An apparatus for controlling a clutch assembly of a driveline of an automotive vehicle having a manually operated

power transmission system, said clutch assembly being operative between a fully coupled condition and a fully uncoupled condition through an allowance disengagement condition and a partial torque transmission condition, comprising a clutch actuating mechanism including a control chamber contractable and expansible between a maximum-volume condition producing said fully coupled condition in the clutch assembly and a minimum-volume condition producing said fully uncoupled condition in the clutch assembly, an electrically operated valve arrangement including a vacuum port for providing communication between said control chamber and a source of vacuum and a plurality of air ports each for providing communication between said control chamber and the open air, said vacuum port being open to develop vacuum in the control chamber for causing the control chamber to contract toward said minimum-volume condition, said air ports having different cross sectional areas and being selectively opened to admit atmospheric air into said control chamber at different rates for causing the control chamber to expand at different rates and accordingly driving the clutch assembly at different velocities toward said fully coupled condition, and an electric control circuit including clutch position detecting means responsive to transition of the clutch assembly between said allowance disengagement condition and said partial torque transmission condition and throttle-valve position responsive means responsive to variation in the degree of opening degree of the throttle valve of the mixture supply system of the vehicle engine, said control circuit being effective to cause said valve arrangement to close said vacuum port in response to a predetermined condition in which the clutch assembly is to be coupled, said control circuit being further operative to cause the air port with the largest sectional area to open and communicate with said control chamber under said allowance disengagement condition of the clutch assembly and to close in response to the transition of the clutch assembly from the allowance disengagement condition into the partial torque transmission condition as detected by said clutch position detecting means and to cause the remaining air ports to selectively open and communicate with said control chamber for causing the control chamber to expand at stepwise varying rates in response to variation in the throttle opening degree detected by said throttle responsive means under the partial torque transmission condition of the clutch assembly.

4,086,993

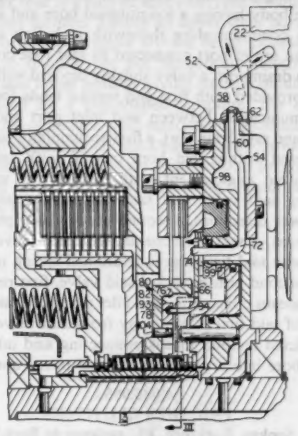
TRANSMISSION OVERSPEED INHIBITOR

Franklin O. Koch, Jr., Edelstein, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 661,087, Feb. 25, 1976. This application Apr. 15, 1977, Ser. No. 787,830
Int. Cl.² F16D *23/10*
U.S. Cl. 192—104 F **15 Claims**

1. In a drive transmission for coupling an engine to a driven load at any selected one of a plurality of drive ratios which comprises a gear section having an input shaft, an output shaft, a plurality of gears and shift means for interconnecting said gears in any of a plurality of predetermined relationships to provide said plurality of drive ratios, fluid pressure operated input clutch means for coupling said gear section input shaft to said engine having an engaged position and a disengaged position, fluid pressure operated output clutch means for coupling said driven load and said gear section output shaft having an engaged position and a disengaged position, and automatic operating control means for applying fluid pressure to said output clutch, an improvment comprising:

an overspeed inhibitor for inhibiting overspeed operation of said drive transmission, said overspeed inhibitor being coupled to said control means and said output clutch for overriding said control means by changing the pressure of fluid applied to said output clutch to disengage said output clutch; and means responsive to said input shaft rotating



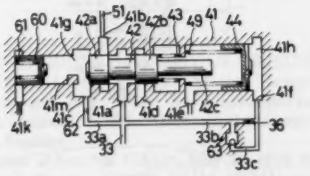
above a predetermined rate for causing said overspeed inhibitor to override said control means.

4,086,994

FLUID PRESSURE MODULATING APPARATUS FOR A FLUIDICALLY ACTUATED FRICTIONAL ENGAGING APPARATUS IN A VEHICLE TRANSMISSION

Koichiro Hirosawa; Tsunehiko Ogasahara, both of Kariya; Kazuo Ishikawa, Hoi, and Noboru Murakami, Nagoya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 2, 1975, Ser. No. 636,871
Claims priority, application Japan, Dec. 11, 1974, 49-142796
Int. Cl.² F16D *25/10*
U.S. Cl. 192—109 F **2 Claims**



1. A fluid pressure supplying apparatus for a fluidically actuated frictional engaging means adapted for use in a vehicle transmission, comprising:

a fluid pressure source;

first conduit means for fluidically communicating said fluid pressure source with said frictional engaging means;

regulator valve means disposed within said first conduit means for regulating the fluid pressure within said first conduit means to a predetermined line pressure;

manual valve means interposed in said first conduit means between said regulator valve means and said frictional engagement means for selecting forward or reverse drive; and

modulator valve means interposed in said first conduit means between said manual valve means and said frictional engaging means for supplying a high fluid pressure at the outlet of said modulator valve means less than said line pressure to said frictional engaging means until frictional engagement is initiated, for reducing said high pressure at the outlet of said modulator valve means to a pressure lower than said high pressure during frictional engagement, and for increasing the fluid pressure at the

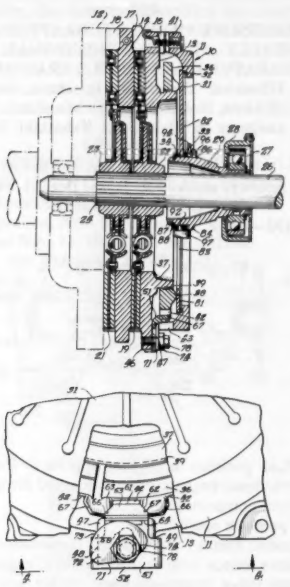
outlet of said modulator valve means to said frictional engaging means after said frictional engagement means is fully engaged, said modulator means comprises a first valve body having a longitudinal bore and a plurality of ports communicating therewith including an inlet port and an outlet port connected to said first conduit means and a drain port, a valve slidably diposed within said bore and provided with first and second lands for controlling communication between said inlet port and said outlet port and said drain port, a first accumulator piston slidably disposed within said bore coaxial with said valve for operative engagement with said valve, spring means urging said valve and said first accumulator piston in opposite directions, a second accumulator piston slidably disposed in said bore coaxial with said valve on the side opposite said first piston, additional spring means urging said second piston toward said valve, first restricted conduit means connecting said inlet port with said bore at the side of said first piston away from said valve and second restricted conduit means connecting said inlet port with said bore intermediate said second piston and said valve.

4,086,995

FRICTION CLUTCHES

Romas B. Spokas, Rockford, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sep. 13, 1976, Ser. No. 722,950
Int. Cl.[2] F16D *11/00, 13/00, 19/00*
U.S. Cl. 192—111 B **4 Claims**



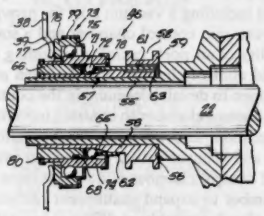
1. In a friction clutch including concentrically disposed housing and pressure plate members and having a rotatably adjustable fulcrum ring mounted on one of said members, improved locking apparatus for retaining said fulcrum ring in a selected position of adjustment with respect to said one member, said apparatus including a slidable locking bar mounted on said one member arranged for radial movement toward and from said fulcrum ring, said locking bar including a nose portion engageable with a complementary slotted portion of said fulcrum ring, a rotatable cam member mounted on said one member having a camming surface engaging said locking bar arranged for urging said locking bar toward said fulcrum ring in response to rotation of said cam, and securing means mounted on said one member effective for securing said cam member and locking bar with respect to said one member.

4,086,996

SELF-ADJUSTING CLUTCH RELEASE BEARING CARRIER ASSEMBLY

Sidney Ulane Gatewood, Roseville, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 28, 1976, Ser. No. 754,912
Int. Cl.[2] F16D *13/75*
U.S. Cl. 192—111 A **17 Claims**



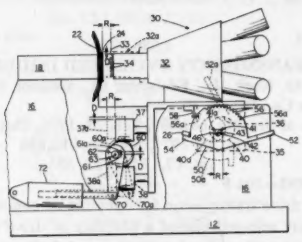
1. A self-adjusting clutch release bearing assembly operated by a clutch release fork, the clutch including release levers adapted to be engaged by a release bearing to disengage the clutch, said bearing assembly comprising a bearing carrier axially reciprocable relative to a driven shaft and operatively connected to the clutch release fork, a clutch release bearing telescoped over the forward end of the bearing carrier adjacent the release levers and providing a running clearance therebetween, a yieldably biased one-way clutch between the release bearing and the bearing carrier, means providing frictional drag between the bearing carrier and the release bearing, and means to disengage said one-way clutch when said bearing assembly is in retracted position.

4,086,997

ADJUSTABLE SUPPORT FOR PRINT HEAD ASSEMBLY

Edward S. Wu, Chelmsford, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.

Filed Mar. 7, 1977, Ser. No. 774,975
Int. Cl.[2] B41J *3/10*
U.S. Cl. 400—57 **9 Claims**



1. A printer including
a frame having end portions and a paper support surface extending transversely therebetween
a print head assembly transversely movable along a printing line parallel to said surface and spaced therefrom and
support means adjustably supporting and guiding said print head for said movement along said printing line and for adjustment in a direction perpendicular to said printing line
said support means including
a cylindrical print head assembly support member having a central axis parallel to said printing line
bearing means mounting said support member on said frame for limited angular displacement about an axis fixed with

respect to said frame and parallel to and displaced from the axis of said support member and

operating means for angularly displacing said support member to move said print head assembly in said direction perpendicular to said printing line for adjustment thereof.

4,086,998

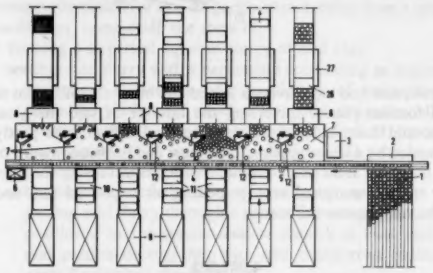
ARTICLE GRADER

Jelle van der Schoot, Aalten, Netherlands, assignor to Staalkat B.V., Aalten, Netherlands

Filed Oct. 14, 1976, Ser. No. 732,375

Int. Cl.[2] B65G *43/08*

U.S. Cl. 198—358 **2 Claims**



1. In an article grader of the type including weighing means for controlling distribution of the articles from a conveyor means to a plurality of accumulation belts and a drive motor for driving said conveyor means, the improvement comprising means for controlling the speed of said drive motor in relation to the quantity of articles present on each of said accumulation belts, each said accumulation belt having walls defining an inlet having a given width, a discharge end having a width that is less than said given width and narrowing wall portions located between said inlet and discharge end which extend at an angle relative to the direction of article movement on each accumulation belt, said means for controlling including a plurality of switch means movable between an on and off position to activate and de-activate, respectively, said drive motor, a plurality of plate members, a like plurality of mounting means for movably mounting a said plate member adjacent to one of said narrowing wall portions of each said accumulation belt so that articles accumulating on a said accumulation belt will contact and move the associated plate member, means for transmitting the movement of a said plate member to a said switch means associated therewith to move said associated switch means between its said on and off positions.

4,086,999

CONVEYOR COMBINED WITH COUPLING FOR HANDLING WORKPIECE

David Ian McDonald, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 668,323, Mar. 18, 1976, abandoned. This application May 17, 1977, Ser. No. 796,847

Claims priority, application France, Mar. 17, 1977, 77 08019; Mar. 17, 1977, 77 08066; Germany, Feb. 16, 1977, 2706567; United Kingdom, Feb. 16, 1977, 046925/77; Japan, Mar. 17, 1977, 52-29727

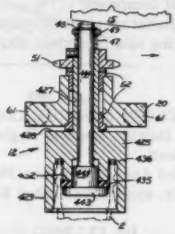
Int. Cl.[2] B65G *47/90*

U.S. Cl. 198—377 **11 Claims**

1. An improved coupling assembly for use in combination with a conveyor means to form a machine that carries hollow workpieces between a workpiece loading station and a workpiece unloading station and then returns to the former, which machine further includes conveyor means movably mounted relative to the base of said machine for supporting at least one such coupling for repeated movement along respective first and second paths to and away from said respective stations for loading and unloading and wherein said improved coupling comprises

(a) a carrier that is a part of said conveyor means;

(b) a support member having an upper stem portion and a lower portion, said upper portion being mounted on said carrier to revolve but not reciprocate relative to said carrier, said lower portion having internal shoulder means surrounded by a cup-shaped structure, the cup being defined by an annular wall surrounding a chamber and an end wall supporting at least a part of said internal shoulder means and connecting said stem portion to said annular wall and having an open end on the bottom of said cup opposite said end wall;



(c) a follower slidably supported in said stem portion and having the lower end of said follower substantially within said chamber, said follower being movable axially toward and away from said open end; and

(d) detent means comprising a resilient ring supported for compression between said follower lower end and said support member internal shoulder means and radially resiliently movable, respectively, in and out from the central portion of said chamber responsive to decompression and compression, respectively, from axial movement of said follower to respectively disengage and engage an internal annular portion of such workpiece.

4,087,000

INDIVIDUAL DELIVERY OF OBJECTS

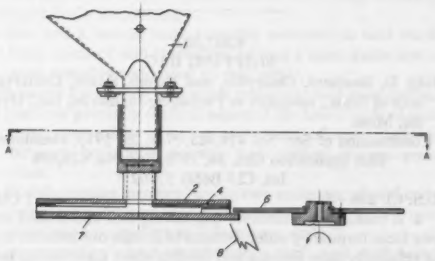
Robert William Abbott; Raymond Stanley Howard, both of Harrogate, and John Arthur Rose, Knaresborough, all of England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 473,634, May 28, 1974, which is a continuation of Ser. No. 271,970, Jul. 14, 1972, abandoned. This application Oct. 6, 1975, Ser. No. 619,869

Claims priority, application United Kingdom, Jul. 15, 1971, 33309/71

Int. Cl.[2] B65G *47/26*

U.S. Cl. 198—454 **1 Claim**



1. An improved process for the delivery of tablet-shaped

objects of uniform height individually to a predetermined delivery point for incorporation in a mixture wherein a stream of objects at least one object in width is continually presented, by moving a forwarding means comprising a movable continuous planar area on to which a continuous supply of objects is fed and to which planar area is imparted an appropriate motion to ensure forwarding of the contacting objects thereon and wherein there is free space above the planar area and means limiting the free space to a thickness more than but less than twice the height of an object so as to prevent piling of one object on another but permitting lateral movement of the object, to a series of temporary retention stations for the objects moving laterally and unidirectionally across the stream of objects until the retention station reaches the predetermined delivery point whereupon the object is disengaged, wherein the improvement comprises:

moving said planar area out of sympathy with a fixed plate means limiting said free space above said planar area.

4,087,001

CONVEYORS FOR ROD-LIKE ARTICLES

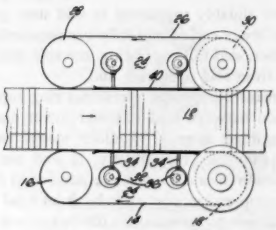
Robert Thomas Daisley, London, England, assignor to Molins Limited, England

Filed Aug. 9, 1976, Ser. No. 712,805

Claims priority, application United Kingdom, Aug. 16, 1975, 34191/75

Int. Cl.² B65G *47/22*

U.S. Cl. 198—456 **17 Claims**



11. Apparatus for conveying a moving stack of rod-like articles comprising conveyor means for moving a stream consisting of a stack of rod-like articles along a predetermined path in a direction transverse to the lengths of said articles; and cooperating displacing means disposed on opposite sides of said conveyor for reciprocally laterally displacing said stream in a direction substantially parallel to the lengths of the articles over part of its length from said predetermined path to a displaced path and back to said predetermined path, including at least one surface positioned on each side of said conveyor means for contact with the ends of the articles in said stream and drive means for moving each of said surfaces with a coordinate movement toward and away from said stream to transversely move the stream in a reciprocal manner in a transverse direction.

4,087,002

SHIPPING BAG

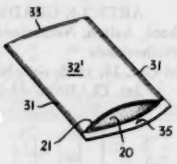
John D. Bambara, Osterville, and Dennis Knaus, Centerville, both of Mass., assignors to Packaging Industries, Inc., Hyannis, Mass.

Continuation of Ser. No. 419,923, Nov. 29, 1973, abandoned. This application Oct. 24, 1975, Ser. No. 625,698

Int. Cl.² B65D *31/02*

U.S. Cl. 206—523 **1 Claim**

1. A cushioned, multilayer bag having first and second exterior faces formed by outer surfaces of at least one exterior layer of relatively thin, fibrous, and flexible sheet material, an inner layer lining substantially the entire bag interior and comprising at least one sheet of foamed plastic, said foam being prestretched relative to said fibrous sheet material and thereby contributing bag-opening curvature to the bag faces, the bag having at least one edge seam wherein two thicknesses of said foamed plastic have been collapsed under heat and pressure to provide marginal areas of said exterior thin, fibrous, and flexible sheet bonded substantially surface-to-surface, the marginal area being greatly reduced in thickness by collapse of the foam



thereat, and said bag having a joined and integral continuum of said foamed plastic traversing the interior of said marginal area, said foam being fused together and still at least partly expanded by a lesser application of heat and pressure inward of the marginal area, said continuum of foam traversing the interior of said marginal area providing an improved seal and cushioning across the seam.

4,087,003

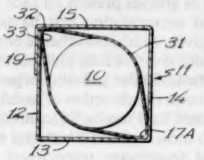
PACKAGE FOR STACKED ARRAY

David J. Adamek, Minneapolis, Minn., assignor to Champion International Corporation, Stamford, Conn.

Filed Jul. 21, 1976, Ser. No. 707,116

Int. Cl.² B65D *81/14, 85/30*

U.S. Cl. 206—583 **1 Claim**



1. A package for an elongated object or a stacked array of objects, said package comprising:

a rectangular paperboard carton having dimensions slightly greater than the maximum lateral dimension of said object or said array;

said carton having front, bottom and rear panels connected along parallel fold lines and a top panel hingedly connected to the upper edge of said rear panel;

a top cover closure flap extending the length of said top cover and hingedly connected along an edge opposite said rear panels, said flap positioned exterior of the upper portion of said front panel as a manufacturer's joint;

end closure flaps attached to the ends of at least said top panel, said flaps connected to said top panel along frangible score lines:

a rectangular sheet of shrinkable plastic film surrounding said array along its lengthwise extent;

a first edge of said sheet of film adhesively attached to said carton adjacent the upper edge of said front panel on the inner facing surface thereof;

said sheet adhesively attached along its midpoint to the inner surface of said carton near the hinge line connecting said bottom and rear panels;

the remaining edge of said sheet of film adhesively attached to the inner surface of said carton adjacent the edge of said top panel opposite said rear panel; and

said sleeve being shrunk into close conformity with said

object or said array to suspend it away from contact with the panels of said carton.

4,087,004

MAGNETIC BENEFICIATION OF CLAYS UTILIZING MAGNETIC PARTICULATES

Alan J. Nott, Crantock near Newquay, England, and William M. Price, Tennille, Ga., assignors to Anglo-American Clays Corporation, Sandersville, Ga.

Filed Oct. 1, 1975, Ser. No. 618,347
Int. Cl.[2] B03B *1/00*
U.S. Cl. 209—9 **24 Claims**

1. A method for magnetically separating discoloring titaniferous contaminants of low magnetic attractability from a crude kaolin clay, comprising the steps of:

forming a dispersed aqueous slurry of said clay;

seeding said slurry with a particulate comprising an aqueous unpeptized suspension of a precipitate of ferrosoferric oxide, the particles of which are of predominantly colloidal size, said precipitate being the product of aqueous coprecipitation of iron (III) with iron (II) salts in the presence of an excess of a strong base; and

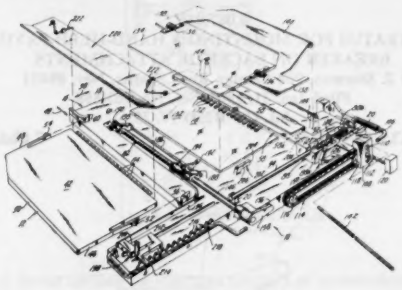
subjecting the seeded slurry to a magnetic separation by passing said slurry through a porous ferromagnetic matrix positioned in a magnetic field to remove at least part of said particulate together with said titaniferous contaminants flocculated therewith.

4,087,005

APPARATUS FOR VIEWING A PRESELECTED ONE OF A PLURALITY OF MEDIA STORED IN A CONTAINER

William C. Kinsinger, New York, and James Ippolito, Bronx, both of N.Y., assignors to Metagraphic Systems, Inc., Poughkeepsie, N.Y.

Continuation-in-part of Ser. No. 467,134, May 6, 1974, Pat. No. 3,993,405. This application Aug. 26, 1976, Ser. No. 717,923
Int. Cl.[2] B07C *5/00*
U.S. Cl. 209—80.5 **24 Claims**



1. Apparatus for transferring a preselected one of a plurality of media from within a container containing said media to a viewing position, comprising:

a frame;

said frame comprising a viewing position;

container-receiving means for retaining a container in a fixed position relative to said viewing position;

selection means for selecting a preselected one of the media retained in said container which is retained by said container-receiving means in said fixed position; and

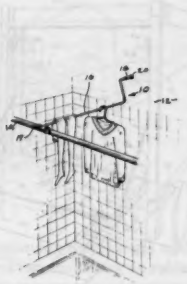
first means operatively associated with said selection means for moving said preselected one of said media from its position within said container to said viewing position and for returning said one media from said viewing position to its original position in said container, while said container remains in said fixed position.

4,087,006

MOUNTABLE AND DISMOUNTABLE CLOTHES HANGER BAR

John Michael Schill, 208 Samuel Street, Kitchener, Ontario, Canada

Filed Dec. 13, 1976, Ser. No. 749,685
Int. Cl.[2] A47F *5/01*
U.S. Cl. 211—86 **4 Claims**



1. A mountable and dismountable clothes hanger bar mountable between a wall and a horizontal member spaced from the wall, the bar comprising:

an elongated bar member of Z-shape with upper and lower legs and a connection part connecting the legs, the lower one of the legs providing a substantially horizontal clothes-supporting portion having a longitudinal axis from which portion clothes can be hung;

a bracket member fastened at or adjacent to the free end of the said bar lower leg and engagable with the horizontal member to be supported thereby so as to prevent longitudinal movement of the bar lower leg;

the said connection part extending upwards and being angled to incline away from the wall in its extension upward, the bar member upper leg providing at its free end a wall-engaging member engagable with the wall at a point higher than the point of intersection of the said longitudinal axis of the lower leg with the wall;

whereby the said clothes-supporting portion is mounted in suspension between the bracket member and the wall-engaging member.

4,087,007

CARGO PLATFORM SYSTEM

Robert E. Drews, Taylor Mill, Ky., assignor to Leyman Manufacturing Co., Cincinnati, Ohio

Filed Dec. 1, 1976, Ser. No. 746,623
Int. Cl.[2] B60P *1/44*
U.S. Cl. 214—75 T **4 Claims**

1. An improved cargo platform system for a cargo opening of a truck body comprising

a first and a second mast assembly mounted to said truck body, each of said assemblies having a mast guide and a mast movably supported by said guide,

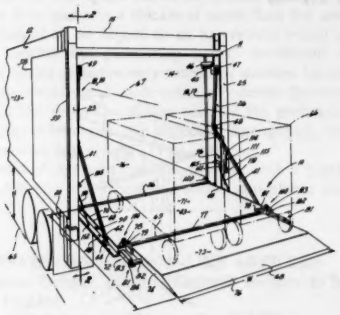
lift means for moving said masts relative to said mast guides,

a platform pivotally secured adjacent the lower ends of said masts to permit swinging movement of said platform between horizontal elevator and vertical storage positions,

a flexible tension member having two ends, one of said ends being connected to said platform and the other of said ends being connected to a first mast, and

a compounding wheel mounted on a shaft, said shaft being carried in and permanently connected to a sleeve fixed relative to a first mast guide, and said compounding wheel being selectively positionable along its rotational axis in a

path parallel to the plane of said cargo opening by axially positioning said shaft within said sleeve between (a) a first operating position whereat said tension member can be engaged by said compounding wheel between said tension member ends when said masts are moved relative to said mast guides for swinging said platform between said elevator and storage positions, at least about one-half the length of said shaft remaining in supportive contact with said sleeve in said fast operating position, and (b) a second operating position whereat said tension member cannot be engaged by said compounding wheel or said shaft when said masts are moved relative to said mast guides for raising and lowering said platform as an elevator.

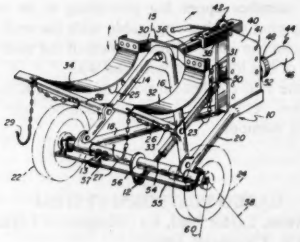


4,087,008

ADJUSTABLE TOW DOLLY

John Cruze Silva, Jr., P.O. Box 1082, Saugus, Mass. 01906

Filed Apr. 28, 1976, Ser. No. 681,234
Int. Cl.[2] B60P *3/12*
U.S. Cl. 214—86 A **12 Claims**



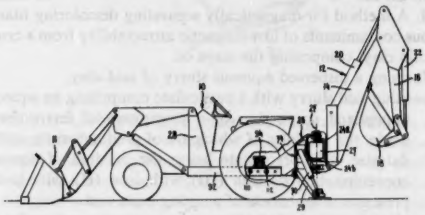
1. A tow dolly for hauling vehicles comprising, a support frame; a plurality of dolly wheels rotatably mounted proximate the base of said frame; a tow hitch mounted at the forward position of said frame; a crane pivotably mounted on said frame proximate the axes of said wheels and extending thereabove so as to pivot transversely to a line drawn between at least two of said wheels; a bumper bar mounted on the upper portion of said crane fixed transversely substantially parallel with said line and pivotable downwardly and upwardly on said crane; a plurality of hooking means mounted at spaced points on said bumper bar for securely engaging a vehicle; a pair of derrick arms pivotably mounted at the lower portion of the frame, the free end portion of each derrick arm being connected to said bumper bar by a vehicle support strap; means for pivotably lowering said crane, bumper bar, derrick arms, and hooks for engaging said vehicle at one end thereof and winching means for pivotably lifting and holding said crane and thus the bumper bar, derrick arm, hooks and said vehicle end upwardly with respect to said dolly wheels to enable towing of said vehicle.

4,087,009

BACKHOE FRAME

Leonardo C. Profenna, Huntington Woods, and James L. Campbell, Westland, both of Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.

Filed Apr. 1, 1976, Ser. No. 672,821
Int. Cl.[2] E02F *3/72*
U.S. Cl. 214—131 A **10 Claims**



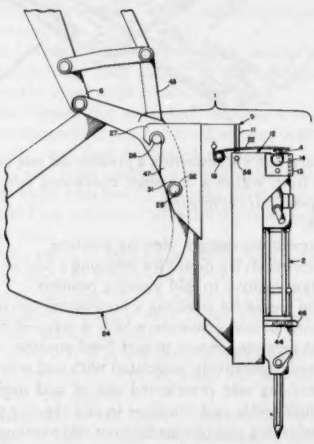
1. A frame for mounting load handling equipment in combination with a vehicle having laterally spaced apart longitudinally extending frame members, the improvement comprising a pair of laterally spaced apart side members disposed in a common horizontal plane, a support structure rigidly interconnected to the rearward ends of said side members and having portions converging rearwardly to form an integral structure which supports a vertical pivot member, said pivot member being disposed entirely above said horizontal plane and being adapted to support load handling equipment for pivotal movement about a generally vertical axis, and attaching means detachably connecting said laterally spaced apart frame members on said vehicle to said side members to form the sole support for said frame on the vehicle.

4,087,010

APPARATUS FOR MOUNTING A HAND-HELD PAVING BREAKER ON BACKHOE ATTACHMENTS

Harry J. Stormon, 908 Camino Real, Sparks, Nev. 89431

Filed Jan. 31, 1977, Ser. No. 763,858
Int. Cl.[2] B25D *17/28*
U.S. Cl. 214—145 R **7 Claims**



1. An apparatus for mounting a hand-held tool, such as a

paving breaker or tamper having an operating lever, on the end of a backhoe attachment for a truck or tractor comprising:

a. attachment means removably affixed to the end of said backhoe and formed with a slide rail;

b. a carriage member slidably mounted on said attachment means for movement between a first non-operative position of said tool to a second operative position including a handle holding member adapted for removably holding the handle portion of said tool;

c. biasing means attached to said attachment means at a fixed end and attached to said carriage member at its movable end for biasing said carriage toward said first non-operative position of said tool;

d. a control lever mounted on said attachment means adapted for engagement with said tool operating in said second operative position of said carriage; and

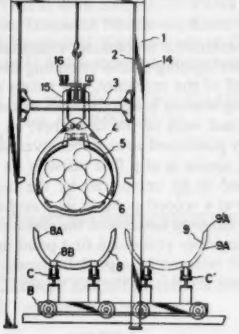
e. said control lever is spring mounted to prevent damage thereto when said carriage moves beyond said normal operative second position.

4,087,011

SYSTEM FOR AUTOMATICALLY TRANSFERRING CARBON ELECTRODES FROM A DRYING PALETTE ONTO A PITCH IMPREGNATION PALETTE

Toru Taniguchi, Kyoto, Japan, assignor to Nikku Industry Co., Ltd., Japan

Filed Jan. 19, 1977, Ser. No. 760,501
Claims priority, application Japan, Mar. 19, 1976, 51-030691
Int. Cl.[2] B65G *67/00*
U.S. Cl. 214—152 **1 Claim**



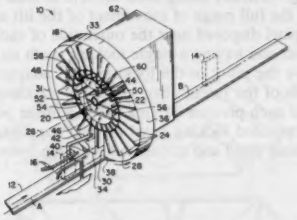
1. In the method for loading a plurality of carbon electrodes on one pallet, passing the carbon electrodes on a pallet through a drying oven and shifting the resulting hot carbon electrodes to another pallet, an improvement comprising loading a plurality of carbon electrodes on a drying pallet of a roller type including at least two U-shaped carbon electrode supports, the spacing between two supports being shorter than the length of the carbon electrodes, passing the carbon electrodes loaded on said pallet through the drying oven, inserting both the ends of each of the carbon electrodes into two carbon electrode-lifting frame fixtures having an O-figured shape, lifting up said two fixtures to thereby lift the carbon electrodes in a bundle-like form, displacing the empty pallet from which the carbon electrodes have been raised, from a position just below the raised carbon electrodes, locating at said position an impregnating pallet for loading carbon electrodes thereon and feeding them to an impregnation vessel, and lowering the raised carbon electrodes onto said impregnating pallet in a bundle-like form.

4,087,012

ASSEMBLY LINE CONTAINER INVERTER

Daniel A. Fogg, Fremont, Mich., assignor to Gerber Products Company, Fremont, Mich.

Filed Apr. 18, 1977, Ser. No. 788,194
Int. Cl.[2] B65G *65/04*
U.S. Cl. 214—312 **5 Claims**



1. Apparatus for removing debris from within open-topped containers during advancement along an endless conveyor, by interrupting the advancement of said containers at a first upright location along said conveyor, progressively inverting said containers and thereafter returning said containers to said conveyor at a second upright location no further advanced along said conveyor than said first location, comprising:

an open hub spaced above and rotatably mounted parallel to said conveyor advancement;

a plurality of blades each attached along a first edge portion to and extending radially from said hub for rotation adjacent to and across said conveyor advancement, said blades being spaced apart to provide adjacent compartments radially disposed around said hub, said compartments being of a dimension sufficient to accommodate at least one container, said hub being further provided with means adjacent to the radially inward end portion of said blades to support said containers against the force of gravity when said containers are near or at inversion;

wall-type structure enclosing other than said first edge of said blades to constrain said containers from falling out of said compartments during rotation of said blades, said wall-type structure including an upstream face defining a container inlet opening overlying said conveyor, a downstream face defining a container outlet opening overlying said conveyor and laterally offset from said inlet opening in a direction opposite to the direction of rotation of said hub, a circular peripheral face spanning said upstream and downstream faces except for an opening generally overlying said conveyor between said inlet and outlet openings;

indexing means to incrementally rotate said hub to transfer said containers from an upright position at said inlet opening to an upright position at said outlet opening;

means for limiting the length and frequency of said incremental rotation;

means for sensing the passage through said inlet opening of at least one of said containers and incrementally advancing said hub so as to provide access to the next adjacent compartment; and

means within said hub for accumulating debris which falls through said hub when containers are transferred through said inverted position.

4,087,013

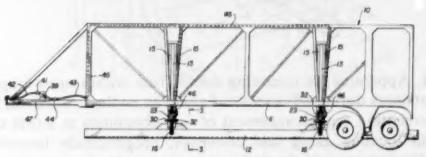
SAFETY LOCKING MEANS FOR LIFT ARMS OF STRADDLE CARRIERS

James Gordon Wiley, Jr., Yakima, Wash., assignor to H.C.M. Company, Inc., Yakima, Wash.

Filed Aug. 2, 1976, Ser. No. 710,723
Int. Cl.[2] B60P *3/40*
U.S. Cl. 214—392 **2 Claims**

1. In a straddle carrier, a wheeled frame, a plurality of oppo-

site side vertically movable lift arms guidably mounted on said wheeled frame and having load engaging and lifting members secured to their lower ends in spaced opposed relationship, and means to support said lift arms securely in selected elevated positions along a full range of movement of the lift arms to thereby relieve a means for raising and lowering the lift arms from the load on the lift arms, said means comprising a toothed ratchet bar secured fixedly to the outer side of each lift arm and extending vertically along each lift arm at least for a distance equaling the full range of movement of the lift arm, a pivoted locking pawl disposed near the outer side of each lift arm and ratchet bar and having a single locking tooth on its upper end and above the pivot of the locking pawl adapted to interlock with teeth of the ratchet bar, relatively stationary supporting means for each pivoted locking pawl, a linear power actuator for each pivoted locking pawl on said supporting means for each locking pawl and connected with the lower end of each



locking pawl below the pivot of the locking pawl, and a biasing spring associated with each linear actuator urging said single tooth of each locking pawl toward engagement with the teeth of the opposing toothed ratchet bar, and remote control means coupled with the linear actuator of each pivoted locking pawl and operable to activate all of the linear actuators in unison against the force of the biasing springs to move the teeth of all of the locking pawls out of engagement with the ratchet bar teeth following relieving of the load on said movable lift arms, and pairs of spaced parallel guide tracks for said vertically movable lift arms on said wheeled frame, opposite side guide roller means on each lift arm engaging said tracks, and said supporting means for each pivoted locking pawl fixed to one pair of said tracks, said supporting means including a partial housing for each pivoted locking pawl, and each linear power actuator being secured to each partial housing for the associated locking pawl.

4,087,014

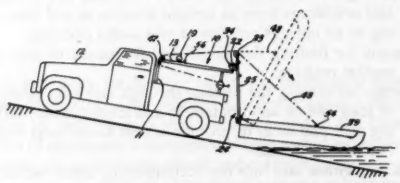
BOAT LOADING AND LAUNCHING CARRIER

Eugene J. Schadle, 86 Linet Ave., Highland Heights, Ky. 41076

Filed Apr. 21, 1977, Ser. No. 789,712

Int. Cl.[2] B60R *9/00*

U.S. Cl. 214—450 **4 Claims**



1. A boat loading and launching carrier for vehicle bodies (comprising) having a frame secured upon ("*a*") the vehicle body (and having), a lateral boat supporting roller mounted upon the rear portion (thereof) of the frame, and a centrally disposed idler puller on the forward end of said frame; comprising a rectangular carriage having a pair of laterally spaced apart, longitudinally extending side rails moveably supported upon the roller; a carriage holddown means disposed centrally on the forward end of the carriage; (a pivot means) a pair of laterally spaced apart, rearwardly facing hooks secured beneath the forward end of the carriage and adapted to engage the roller to limit the downward movement of the carriage around the roller as the carriage and the boat approach gravity operated tilting positions; laterally spaced apart cooperative, separable (hinged) hinge means between the rear end of the carriage and the stern of (a) the boat; a line passed over the holddown means and around the idler pulley; laterally spaced apart, separable means connecting the free end of the line to an intermediate part of the boat; and a power operated reversible means on the vehicle body for controlling payout and winding in of the line, whereby tension in said line between the holddown means and the boat eases the carriage and the boat as they move on the roller from loaded toward tilted positions into engagement of the (pivot means) hooks with the roller.

4,087,015

CLOSURE MEANS FOR A CONTAINER

Colin Albert Murdoch, 14a Hassall Street, Timaru, New Zealand, assignor to Colin Albert Murdoch, Timaru, New Zealand

Filed Apr. 12, 1977, Ser. No. 786,756

Claims priority, application New Zealand, Apr. 12, 1976, 178682

Int. Cl.[2] B65D *55/02, 85/56;* **A61J** *1/00*

U.S. Cl. 215—201 **7 Claims**

1. Closure means for a container comprising:

(a) a cap having plug means extending therefrom,

(b) in a wall of the container, slot means retaining the plug for sliding therein across the wall of the container,

(c) in the said wall of the container, an opening into the container positioned so as to be covered by the cap when the plug means is at a first point in its travel in the slot means and to be uncovered by the cap when the plug means is at a second point in its travel in the slot means; wherein the plug means and the slot means are shaped to engage together at the said first point in the travel of the plug until released by a predetermined movement of the plug means relative to the slot means.

4,087,016

TIGHTLY SEALING SAFETY CAP

Edward Johnson Towns, Convent Station; Edward Morris Brown, Livingston; Leonard Dykstra, Hasbrouck Heights; Joseph Frank Spano, Westfield, and John Daniel Proctor, Summit, all of N.J., assignors to Lermer Packaging Corporation, Garwood, N.J.

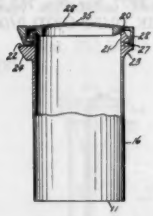
Filed Jul. 22, 1977, Ser. No. 818,157

Int. Cl.[2] B65D *55/02, 85/56;* **A61J** *1/00*

U.S. Cl. 215—211 **4 Claims**

1. In a combination container and safety type cap therefor, the container including an open end portion defining a mouth and having a peripheral flange thereon, at least one segment of which is discontinuous, said cap including a generally planar end wall, a cylindrical side wall, and a plurality of inwardly facing projections selectively engaging said peripheral flange when said cap is in engaged condition upon said container, improved sealing means comprising: said container defining an inner substantially cylindrical surface in an area adjacent said mouth; said end wall of said cap having an inner surface and an annular inwardly directed sealing flange extending laterally

from said inner surface; said flange having an effective radial thickness substantially greater than the thickness of said end wall, and an effective outer diameter slightly greater than the effective internal diameter of said cylindrical inner surface; said flange including an angularly disposed end surface forming camming means relative to said mouth; whereby, upon the closing of said cap upon said container, said flange contacts



said opened end portion thereof to cam said flange within said mouth and centripetally compress said flange to a degree wherein the effective outer diameter thereof corresponds to the diameter of said inner cylindrical surface of said container, distortion of said flange being transmitted to said end wall of said cap to resiliently bow the same outwardly relative to said container.

4,087,017

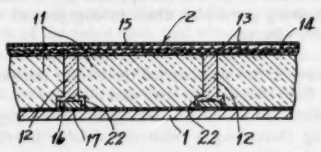
HEAT INSULATING DEVICE FOR LOW TEMPERATURE LIQUIFIED GAS STORAGE TANKS

Tomiyasu Okamoto; Tsunanori Nishimoto; Kaoru Sawada; Koji Hayakawa, and Tomomichi Kurihara, all of Osaka, Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed Sep. 10, 1976, Ser. No. 722,118

Int. Cl.² B65D *87/24*

U.S. Cl. 220—445 **5 Claims**



1. In a heat insulating device for the outer surface of a spherical low temperature liquified gas storage tank, the improvement comprising:

a plurality of rigid foam synthetic resin block plates bonded to said outer tank surface with joint spaces between adjacent block plates;

means for pressing said block plates against said outer tank surface during the bonding of said block plates thereto, said pressing means including seat means secured to said outer tank surface in said joint spaces and pressing jigs detachably engageable with said seat means and with the outer surfaces of said block plates, said block plates being notched to receive said seat means;

a heat insulating filler of soft foam synthetic resin inserted in said joint spaces and embedding said seat means; and

moisture-proof means covering said block plates and said filler, said moisture-proof means comprising a laminate of glass mesh and polyurethane foam and a water-proof material covering said laminate.

4,087,018

TAMPER PROOF SEAL FOR A CLOSURE

Charles Norman Tebbutt, Ruislip, England, assignor to Metal Box Limited, Reading, England

Filed Apr. 4, 1977, Ser. No. 784,462

Claims priority, application United Kingdom, Apr. 9, 1976, 14543/76

Int. Cl.² B65D *51/20*

U.S. Cl. 220—257 **10 Claims**

1. A lever lid and ring assembly for closing an end of a container body, said assembly comprising a ring, said ring having peripheral attaching means for attachment to a container body, a lever lid push fitted in the ring and removable therefrom for access to the interior of an associated container body, there being a joint between said ring and said lid, and a sealing member bridging the joint between the ring and the lid along the whole length of the joint, said sealing member having an outer periphery adhering to the ring and an inner portion adhering to the lid, said sealing member having a central opening, and a pull tab integral with said sealing member extending into said central opening.

4,087,019

PLUG ARRANGEMENT FOR A CONTAINER

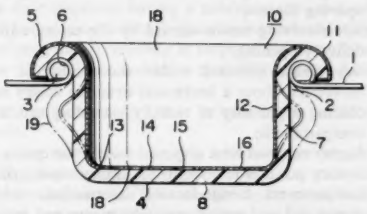
Noboru Yamazaki, Chiba, Japan, assignor to Atsugi Kinzoku Kogyo Co., Ltd., Kyobashi, Japan

Filed Feb. 13, 1976, Ser. No. 658,062

Claims priority, application Japan, Aug. 28, 1975, 50-118440[U]; Aug. 8, 1975, 50-108997[U]

Int. Cl.² B65D *51/22*

U.S. Cl. 220—258 **2 Claims**



1. A plug arrangement for a metallic container having an opening in a top plate thereof, and having an annular turned-over wall along the circumference of the opening, comprising;

an outer plug of soft, resilient material capable of being seated in said opening and having an annular flange capable of being seated over said annular turned-over wall of the opening, said plug having a peripheral wall capable of being seated in said opening, and a bottom wall, and said outer plug having a dish-shaped periphery; and,

an inner plug capable of being seated in said dish-shaped outer plug and having a flange covering said annular flange of said outer plug, a peripheral wall conforming to the peripheral wall of said outer plug, and a bottom wall capable of being superposed on the bottom wall of said outer plug, said inner plug having a dish-shaped periphery and being made of metal which is readily deformable but not restorable in shape;

said outer plug having a blind bottom,

said bottom wall of said inner plug having an opening in the central portion thereof and further having a projection connected at one end by a stem portion to the outer circumference of said inner plug bottom wall and extending at the other end into said opening, said projection being located on said blind bottom when said inner plug is seated in said outer plug in superposed relation thereto, and

said dish-shaped peripheral walls of said inner and outer plugs being bulged radially outwardly of the opening, when said inner plug is to be seated in said outer plug seated in said opening in superposed relation to each other, whereby said opening is tightly sealed.

4,087,020

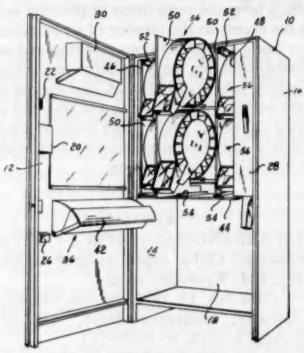
ARTICLE VENDING MACHINE HAVING ROTARY STORAGE COMPARTMENTS

Merrill Krakauer, 1 Deer Path, Short Hills, N.J. 07078

Continuation-in-part of Ser. No. 582,388, May 30, 1975, abandoned. This application Jul. 1, 1976, Ser. No. 701,881

Int. Cl.[2] G07F *11/82*

U.S. Cl. 221—84 **50 Claims**



1. An article vending machine comprising, in combination:

a casing including a front wall portion having a delivery opening therein;

article receiving means carried by the casing adjacent the delivery opening;

rotary means mounted within the casing for rotational movement about a horizontal axis, the rotary means including a plurality of radially extending article storage compartments;

a display compartment disposed within the casing in a stationary position relative to the rotary means, the display compartment being located intermediate said rotary means and said article receiving means and including an upper end and a lower end, to permit the viewing of an article within the display compartment from the front of the machine, rotation of the rotary means carrying successive article storage compartments into juxtaposition with the upper end of said display compartment;

a display compartment door assembly distinct from said rotary means and the storage compartments thereof movable relative to the display compartment, the door assembly having a door portion for blocking the lower end of said display compartment;

operating means for rotating the rotary means through an angle sufficient to locate one of the article storage compartments in juxtaposition with the display compartment and for moving said door assembly to unblock the lower end of said display compartment and permit an article on display to drop by gravity into said article receiving means, an article within said one storage compartment thereupon dropping by gravity into the upper end of the display compartment; and

means for returning said door assembly to its initial position to block the lower end of said display compartment.

4,087,021

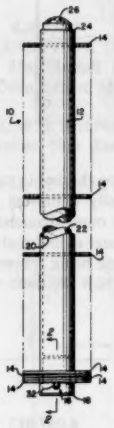
GAME CHIP DISPENSER WITH MARKER

Julia Cotugno, 217F Cottrell Rd., Matawan, N.J. 07747

Filed Jan. 21, 1977, Ser. No. 761,393

Int. Cl.[2] B43K *29/20;* **G07D** *9/00*

U.S. Cl. 221—199 **3 Claims**



1. Dispenser means, for game-play chips and the like, comprising:

means for receiving a plurality of game-play chips in slidable engagement therewith;

said receiving means comprising an elongate element having a termination at one end thereof which defines a dispensing end; and

first means coupled to said one end of said element, and second means coupled to the opposite end of said element, for retaining game-play chips in engagement with said element; wherein

at least one of said first and second means has means yieldably responsive to pressure applied thereto for releasing game-play chips from engagement with said element;

said element has an external, elongate surface disposed for defining therealong a relatively slidable interface with game-play chips;

said first and second means each comprises means projecting from said surface for obstructing thereat game-play chips slidably-interfaced movement relative to said surface;

one of said first and second means further comprises an end cap;

said cap having means effecting a releasable interference fit of said cap with said opposite end of said element;

said cap further has an annular flange which defines said projecting means thereof; and

said element is hollow, having a storage chamber formed therewithin in which slidably to carry a marking means; further including

marking means slidably and replaceably carried within said chamber; wherein

said chamber opens onto said opposite end of said element;

said marking means includes a marker on one end thereof;

said marker projects from said opposite end of said element;

said cap comprises a cup-shaped element for shieldably protecting said marker therewithin; and

said marking means and said chamber have mutually engag-

ing surfaces which define therebetween a frictionally-releasable engagement.

4,087,022

DEVICE FOR DISPENSING A TOILET SOLUTION

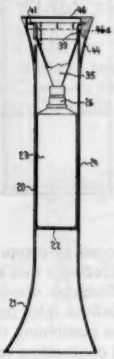
Giuseppe Zanetti-Streccia, Bruckfeldstrasse 11, 3012 Berne, Switzerland

Filed Apr. 19, 1976, Ser. No. 678,370

Claims priority, application Switzerland, Apr. 30, 1975, 5570/75

Int. Cl.[2] B65D *83/14*

U.S. Cl. 222—183 1 Claim



1. A dispensing device comprising a body including a cylindrical part for removably receiving a pressurized container having an upstanding valve stem and a peripheral shoulder, an actuator movably mounted on the upper part of said body for engagement with the container valve stem to control the spraying of a determined quantity of product from the container, a hollow truncated base extended downwardly from said cylindrical part to support said actuator at an elevated position, said cylindrical part comprising two aligned separable portions to facilitate exchange of the pressurized container, said actuator comprising a spray cone having vent holes, the movement of said actuator being guided by the cylindrical part of said body, said actuator having a tip located to be centered on the axis of the valve stem, said actuator including a piston sliding in a tubular guide fitted on the peripheral shoulder of the pressurized container, said actuator also defining a chamber and at least one dispensing passageway between said chamber and spray cone for passage of the sprayed substance into said spray cone.

4,087,023

AIRSPACE TYPE SPRAY DISPENSER

Harry Szczepanski, 755 Oakleigh Rd., NW., Grand Rapids, Mich. 49504

Filed Mar. 28, 1977, Ser. No. 781,748

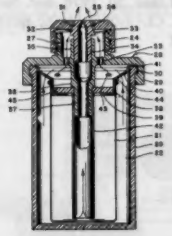
Int. Cl.[2] B67D *37/00*

U.S. Cl. 222—209 12 Claims

1. A spray dispenser for liquid materials, said dispenser including a resiliently deformable outer housing, a deformable inner container disposed in said outer container to define an airspace between said containers, nozzle means mounted in said outer container and communicating with said inner container, and means forming an air passage communicating with said airspace and having an outlet adjacent said nozzle means, wherein the improvement comprises:

means forming a tubular receptacle normally fixed with respect to said outer container, portions of said air passage being disposed around said receptacle;

a nozzle element having a portion thereof received in said receptacle, said element having a central bore and a peripheral surface adjacent an end constituting the outlet of said nozzle means; and



a cap normally engaging said outer container and having an opening normally surrounding said peripheral surface and normally in spaced relationship therewith.

4,087,024

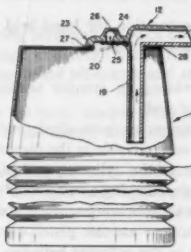
FLUID DISPENSER

Harold B. Martin, West Caldwell, and Arthur R. Weber, Somerset, both of N.J., assignors to Graber-Rogg, Inc., Cranford, N.J.

Filed Feb. 27, 1976, Ser. No. 662,245

Int. Cl.[2] B65D *37/00*

U.S. Cl. 222—211 2 Claims



1. In a fluid dispenser having a container provided with a bellowed wall portion to form a chamber, and which is capable of compressing and recovering in response to the application of a force thereon, a molded valve assembly connected to said container, which comprises:

a lower member having a base provided with an aperture therein,

a dispensing tube communicating with said aperture,

a flex type flap member integrally connected to and extending from said base in a substantially similar plane, said flap member having a thickness relatively smaller than that of the base, and

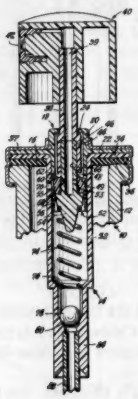
an upper member having a body portion removably connected to said base and which forms a dispensing nozzle when connected to said base, a head portion extending from said body portion, and a formed air opening extending through said head portion for communication with the chamber of the container, said air opening being located in spacial relationship with the container chamber such that one side of the flex type flap member is in normally intimate contact with the formed air opening and the other side of the flap member is exposed to the container chamber, the member capable of being moved from said air opening in response to external air passing through said air opening into the container and being moved against said air opening upon compressed air being generated within the container for forcing fluid from the chamber through the dispensing tube and dispensing nozzle.

4,087,025

LEAKPROOF PUMP FOR HAND-HELD DISPENSERS

Wolf Steiman, 649 Springer Rd., Fairfield, Conn. 06430

Filed Dec. 20, 1976, Ser. No. 752,669
Int. Cl.[2] G01F *11/00;* B05B *11/02*
U.S. Cl. 222—321 3 Claims



1. A pump construction for hand-held dispensers and the like, comprising in combination:

(a) a cylinder,

(b) means providing an annular sealing shoulder on the cylinder inner wall,

(c) a hollow plunger reciprocatively mounted at the top of the cylinder and movable in the direction of its axis in the upper portion of the cylinder, said plunger having a discharge passage, carrying a valve head at its lower portion, and having a slide bearing surface above the valve head,

(d) a resilient hollow annular piston carried by the plunger and movable in the cylinder between raised and lowered positions, said piston having a body portion provided at it top end with a bore having a smaller diameter at the top of the piston, the smaller diameter portion of the piston bore being sealingly engageable with and slidable longitudinally on the bearing surface of the plunger between high and low positions thereon and constituting a small high-pressure area which continuously presses against said bearing surface, said piston having a lower skirt portion engageable with the cylinder walls, and having a cooperable valve seat engageable with the valve head when the piston is in said low position on the plunger, and

(e) means providing a fluid passage from the cooperable valve seat of the piston to the discharge passage of the plunger when the cooperable valve seat is disengaged from the valve head,

(f) said plunger having an annular, outer valve seat located above its slide bearing surface and engageable with the upper end of the piston body portion when the piston is in its high position on the plunger,

(g) the upper end of the piston body portion constituting a valve which engages the sealing shoulder in the cylinder when the piston is in its raised position in the cylinder,

(h) the bottom end of the piston body portion being conical,

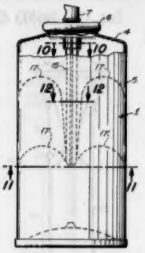
(i) said valve head of the plunger having a conical valve surface engageable with the bottom end of the piston body portion and squeezing said bottom end radially inward to improve the seal of the top end of the piston body portion against the bearing surface of the plunger during storage and during raising movement of the plunger.

4,087,026

BARRIER PACKAGE

Tor H. Petterson, 31248 Palos Verdes Dr. West, Palos Verdes Peninsula, Calif. 90274

Continuation-in-part of Ser. No. 384,700, Aug. 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 180,790, Sep. 15, 1971, abandoned. This application Oct. 6, 1975, Ser. No. 619,664
Int. Cl.[2] B65D *83/14*
U.S. Cl. 222—386.5 3 Claims



1. A disposable aerosol container comprising:

a. a container member including a first wall portion having a product inlet and discharge opening, a second wall portion having a propellent inlet opening and a third connecting wall portion positioning the first and second wall portions in spaced confronting relation;

b. a product discharge valve for the product inlet opening;

c. a propellent inlet means for the propellent inlet opening;

d. a formed-in-place coating adhesively and sealingly bonded initially to the inner surface of the second and third wall portions of the container member;

e. a fluid product isolated from the inner surface of the container member in the region of said coating and having a volume approximately equal to the total volume of the container member less the volume of a pressurized propellent required to discharge the product from the container member;

f. a pressurized propellent, having a potential volume greater than the volume of the container member, interposed between the coating and second wall surface of the container member;

g. the coating having greater strength than its bond with the inner surface of the container member whereby, upon introduction of the pressurized propellent, the coating is progressively peeled from the second wall portion of the container member only to the extent required to admit the pressurized propellent and to form a dome shaped barrier of limited area relating to the initial pressurized volume of the propellent, the barrier also forming a peripheral zone merging into the intact coating, said barrier, when subject to simultaneous discharge of the product and expansion of the propellent, being placed under tension sufficient to cause progressive peeling of the peripheral zone from the connecting wall portion of the container member, said tensioned barrier and the peripheral peeling causing the barrier to retain its dome shape and prevent isolation of portions of the product from the discharge valve, whereby the maximum quantity of the product is ultimately discharged from the container member;

h. a stem secured to the central region of the first wall portion and extending therefrom toward the barrier;

i. the barrier, during movement toward the first wall portion on discharge of the product, initially engaging the extremity of the stem causing the barrier to surround the stem and assume a toroidal dome shape, continued movement of the barrier causing the central portion of the barrier to fold about the stem while maintaining its toroidal dome shape;

j. the stem including means forming with the folded portion of the barrier at least one passageway communicating with the discharge valve and preventing entrapment of the product, and the length of the stem is in the order of two-thirds to three-fourths the spacing between the first and second wall portions.

4,087,027

AEROSOL CAN ATTACHMENT

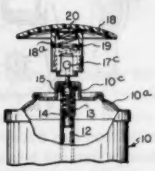
Edwin J. Haas, 17004 Pearldale Ave., Cleveland, Ohio 44135

Continuation of Ser. No. 644,114, Dec. 24, 1975. This application Jan. 10, 1977, Ser. No. 758,016

The portion of the term of this patent subsequent to Sep. 23, 1992, has been disclaimed.

Int. Cl.[2] B65D *83/14*

U.S. Cl. 222—402.13 **1 Claim**



1. An aerosol dispenser attachment for use with a cylindrical pressurized tubular can having a top and a bottom and an elongated body connected between them in an air-tight manner and with a control valve structure in said can fixed below the top of said can and having a liquid inlet tube extending therefrom to a zone adjacent the bottom of said can and having a liquid outlet tube of predetermined diameter extending axially of said can in an air-tight manner to the top of said can, said control valve structure including a flexible seat mounted on the underside of the top of said can opposite said outlet tube, there being a central opening through said seal, said outlet tube fitting upwardly tightly against the seal of said control valve structure and said structure including a movable valve member normally closing against said seal such that pressure downward axially of said outlet tube releases pressurized liquid from said can through said valve and outlet tube; a first helical compression spring having an outside diameter fitting snugly in said outlet tube and supported in said outlet tube effective on said control valve to urge the same upwardly; and a spray head generally cylindrical having a short tube concentric with said spray head and having a single inlet at its lower end of a diameter snugly fitting downwardly into said central opening of said valve seal and extending at its upper end radially outwardly in said spray head to a discharge point in the periphery of said spray head; the combination therewith of a circular actuator disk, a downwardly projecting cylindrical tubular projection concentric with said disk and rigidly connected therewith and of a diameter to snugly embrace said spray head, said cylindrical tubular projection being cut away at the bottom to expose said discharge point when said control valve is opened, a second compression spring held in said tubular projection between said actuator disk and said spray head, and the parts being so arranged that pressure on said actuator disk axially of said outlet tube will compress said second compression spring sufficiently to compress said first compression spring and to cause short tube to press on said control valve structure and release the contents of said can to flow through said outlet tube and said short tube and said spray head to said discharge point.

4,087,028

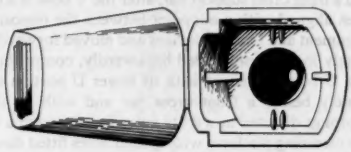
SNAP LOCK DISPENSING CAP

Frank J. Lang, 11702 Center Dr., Lemont, Ill. 60439

Filed Dec. 16, 1976, Ser. No. 751,242

Int. Cl.[2] B67D *3/00*

U.S. Cl. 222—556 **5 Claims**



1. A universal, plastic, one-piece, snap-type closure for a variety of containers of the type having a dispensing opening,

the closure having a body-portion for mounting on the container adjacent its opening and also having a cappportion,

the body-portion having an orifice in a wall portion remote from the dispensing opening of the container,

the cap portion having a dimple for sealing the orifice of the body portion,

a unitary hinge having an axis and forming an integral connection between the body-portion and the cap-portion,

the distance from the axis of the hinge to the orifice being greater than the distance from the axis of the hinge to the dimple,

the cap-portion being arranged to pivot over the body-portion about the hinge so that the dimple fits over the orifice,

the axis of the hinge being off-center and at one side of the body-portion,

the wall portion in the body portion being approximately at a right angle to a line drawn between the orifice and the axis,

inherent tension between the body-portion and the cap-portion causing a fluid-tight seal of dimple against orifice when the dimple and the orifice are in juxtaposition.

4,087,029

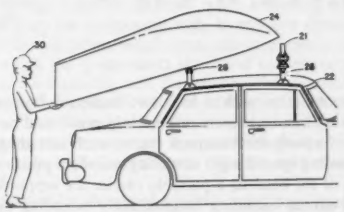
ALIGNMENT AND LOCKING DEVICES USED ON LOADING AND CARRYING A BOAT ON A VEHICLE ROOF

Clifford L. Shoemaker, 20632 3rd Ave. S., Seattle, Wash. 98148

Filed Nov. 29, 1976, Ser. No. 745,794

Int. Cl.[2] B60P *3/10*

U.S. Cl. 224—42.1 H **2 Claims**



1. Alignment and locking devices each paired with another arranged in opposite hand and used when loading a V bow boat having externally extending rails, on front and back cross supports in turn secured to a top of a carrier vehicle, each alignment and locking device comprising:

a. combined sloping guide bar and a horizontal platform with spaced holes, the sloping guide bar to direct a boat toward the midpoint between the paired alignment and locking devices, and the horizontal platform, in addition to positioning the sloping guide bar, being also arranged to

clearly extend toward the centerline of a vehicle in sufficient distance to bear down against a boat rail;

b. a fastening assembly to secure the combined sloping guide bar and horizontal platform at a spaced distance above a front cross support bar to accommodate the restrictive confinement of a boat rail between the horizontal platform and a front cross support bar, after the V bow of a boat has been aligned with a midpoint between the opposite hand alignment and locking devices and moved forwardly to be snugly locked until pulled backwardly, comprising:

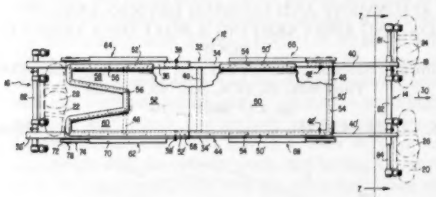
1. a U bolt positioned with its lower U portion immediately below a front cross bar and with its threader prongs directed upwardly away from a top of a vehicle;
2. a clamping platform with spaced holes fitted down over the upwardly directed threaded prongs of the U bolt for securement against a top of a front cross bar;
3. fastening nuts threaded on the upwardly directed threaded prongs of the U bolt and tightened to hold the clamping platform and the U bolt against a front cross bar; and
4. additional fastening nuts also threaded on the upwardly directed prongs of the U bolt and spaced as a group above the clamping platform, and also arranged adjacent respective top and bottom surfaces at the spaced holes of the horizontal platform, and thereafter tightened against the horizontal platform to position it at a selected distance above a front cross bar.

4,087,030

BACKPACK FRAME-BORNE CARRIER FOR A PATIENT OR OTHER LOADS

William E. Knight, 5000 Park Pl., Bethesda, Md. 20016

Filed Nov. 7, 1975, Ser. No. 630,081
Int. Cl.[2] A47D *13/02*
U.S. Cl. 224—6 17 Claims



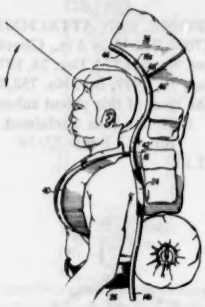
1. In combination with at least two backpack frames to be worn by two human bearers respectively positioned on opposite ends of a load, the backpack frames each including vertically extending spaced rigid mounting members positioned on the backs of the bearers; a portable carrier for supporting the load, said carrier including longitudinally extending opposite spaced side frame members; and connecting means releasably securing opposite end portions of said side frame members to said mounting members of said backpack frames respectively at any one of selected vertical positions along said mounting members to enable the load to be carried by the bearers through means of the backpack frames worn thereby, said connecting means positively securing said side frame members to said mounting members while permitting rotational angular movement in a vertical plane therebetween to permit changes in the relative positions of said backpack frames and said carrier while the carrier is in use.

4,087,031

BACKPACKING FRAME

Peter M. Fenner, 447 Mariomi Rd., New Canaan, Conn. 06840

Filed Oct. 6, 1975, Ser. No. 620,249
Int. Cl.[2] A45F *3/10*
U.S. Cl. 224—25 A 8 Claims



1. A backpacking frame having a major frame portion to support a mating pack above and behind the head of a wearer without interfering with backward movement of the wearer's head, said major frame portion including a pair of interconnected, spaced, elongate members adapted to be supported parallel to a wearer's back extending from his shoulders to a point below his waist to conform generally with the shape of his spine, the major frame portion further including a wrap-around waist belt attached to said elongate members and adapted to be disposed about the waist of the wearer;

said backpacking frame having a minor frame portion comprising a pair of upwardly extending, spaced, contour leg portions attachable at their lowermost ends to the top of said major frame portion, said leg portions being connected to each other at their uppermost ends via a transverse portion disposed over the top of a wearer's head, said contour leg portions each comprising a first, generally parallel segment extending upwardly and rearwardly from said major frame portion so as to be spaced behind and in generally conforming relationship to the back of both the neck and head of a wearer of the backpacking frame, said contour leg portions each further comprising a second upwardly extending segment interconnecting said first segment with one end of said transverse portion, each of said second segments extending forwardly and inwardly towards said transverse portion so as to be spaced from and in generally conforming relationship to the contour along the top of the head of a wearer of the backpacking frame;

said minor frame portion being connected with and extending upwardly from said major frame portion such that a pack to be supported can be attached at an upper end to said minor frame portion above the wearer's head and be attached at a lower end to the major frame portion; and

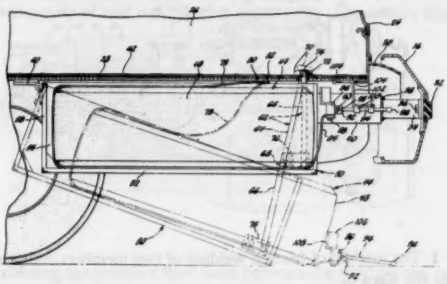
a pair of shoulder straps supported from opposite sides of said major frame portion and adapted to be engaged by a wearer over his shoulders and down his chest, said straps each supporting a pouch on one side of the wearer's chest to allow the wearer to shift a portion of the packframe load to the front of his body.

4,087,032

SPARE TIRE STOWAGE ASSEMBLY

Allan G. Miller, Sterling Heights; John Himka, Farmington, and Gerald L. Patrick, Utica, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 12, 1977, Ser. No. 796,126
Int. Cl.[2] B62D *43/04*
U.S. Cl. 224—42.23 2 Claims



1. In a vehicle, a spare tire carrier for underfloor stowage of the tire in a generally horizontal position comprising: a spare tire support structure having a bottom portion extending beneath the tire, a forward end portion extending upward from the bottom portion and upward extending side portions with the top and rear end uncovered for removing the tire from the structure; hinge means between the upper edge of said forward end wall and the vehicle floor to permit lowering of the rear portion of the support structure to the ground; lowering and raising means including an elongated member attached to the rearward portion of the tire support structure and extending upward through an opening in the vehicle floor for remote pivoting of the support structure about the forward hinged edge; an elongated strip of flexible material with one end attached to the vehicle forward of the rear end of the vehicle and extending over the spare tire; then downwardly and across the forward edge of the tire and, finally, rearwardly beneath the tire and between the tire and the bottom portion of the tire support structure; retaining means for detachably securing the second end of said elongated strip to the vehicle at a location rearward from said spare tire and for providing a handle for selectively imparting rearward motive force to the second end of the strip and to the spare tire, thus causing the spare tire to be moved rearward from the support structure to a position out from the vehicle rear overhang.

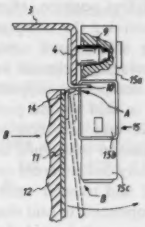
4,087,033

APPARATUS FOR OPENING FILM CASSETTES

Günther Dömges, Oberhaching; Hartmut Scheller, Munich, and Helmut Zangenfeind, Puchheim, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Jul. 19, 1976, Ser. No. 706,214
Claims priority, application Germany, Jul. 31, 1975, 2534196
Int. Cl.[2] B26F *3/00*
U.S. Cl. 225—1 11 Claims

1. An apparatus for opening substantially rigid elongated synthetic-plastic film cassettes, having transversely spaced longitudinally extending lateral face portions, particularly cassettes having a film pay-out section and a film take-up section which are connected by a film-guiding web section of U-shaped cross-section, comprising a support; first means for engaging a first portion of a cassette and for retaining said cassette against movement relative to said support; and second means movable relative to said support and said cassette for exerting upon a second portion of said cassette, at a location spaced from said first cassette portion, a force acting transverse to the elongation of the cassette in direction from one toward the other of said lateral face portions and sufficient to displace



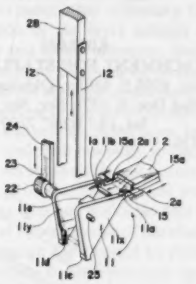
said second cassette portion relative to said first cassette portion and thereby to crack open said cassette.

4,087,034

AUTOMATIC COMPONENT MOUNTING APPARATUS

Yoshio Kikkawa, Kyoto, and Shigeru Namiki, Kadoma, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 14, 1976, Ser. No. 750,417
Claims priority, application Japan, Dec. 17, 1975, 50-151418; Dec. 17, 1975, 50-151419
Int. Cl.[2] B23Q *41/00*
U.S. Cl. 227—90 10 Claims



1. In an automatic component mounting apparatus for automatically mounting on a plate-like workpiece having a plurality of pairs of holes electrical components one at a time, each of said components being of a type constituted by a component body having a pair of terminal wires extending axially outwardly from the component body in opposite directions with respect to each other, which apparatus comprises a supply unit from which the components are issued successively one at a time, and a mounting unit for bending the terminal wires of each component which has been delivered from said supply unit, and also for mounting the component on the workpiece with the bent terminal wires inserted through a pair of holes in the workpiece, the improvement wherein said mounting unit comprises:

a substantially elongated inserting head supported for axial sliding and rotary motion between elevated and lowered positions in a direction parallel to the longitudinal axis thereof and first and second positions angularly spaced about said longitudinal axis thereof, respectively, said inserting head including a pair of spaced inserting bars made of elastic material;

a pair of opposed, first and second transfer units positioned on respective sides of said inserting head and connected to the supply unit for receiving the components in each of said transfer units; and

a shaper assembly pivotally carried by said inserting head for

selective movement between first and second positions and having spaced, first and second component supports, said first component support being, when said shaper assembly is in said first position, aligned with said first transfer unit for receiving the component from said first transfer unit while said second component support is substantially downwardly oriented toward the workpiece, said second component support being, when said shaper assembly is in said second position, aligned with said second transfer unit for receiving the component from said second transfer unit while said first component support is substantially downwardly oriented towards the workpiece, each of said transfer units having means for transferring the components to said shaper assembly, each of said component supports in said shaper assembly having means shaped so that, as the component is transferred from the adjacent transfer unit onto the shaper assembly, said component support receives said component so transferred while causing the outer end portions of said terminal wires of said component transferred to be bent in the direction of said adjacent transfer unit;

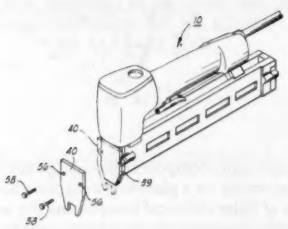
said inserting head when moved to the lowered position causing the inserting bars to push said component carried by either one of said first and second component supports then downwardly oriented towards the workpiece for moving the bent outer end portions of the component terminal wires facing the workpiece through the pair of holes in the workpiece.

4,087,035

ATTACHMENT FOR STAPLING GUN

Everette Harmon, 8505 S. Miller, Oklahoma City, Okla. 73159

Filed Dec. 8, 1976, Ser. No. 748,706
Int. Cl.[2] B25C *7/00*
U.S. Cl. 227—120 **1 Claim**



1. A workpiece guide attachment device for use in combination with a pneumatic stapling gun of the type which has a handle and driver head in association with an automatic wire staple magazine continually positioning staples for vertical drive thrust beneath the driver head and within a forward nose plate housing the vertical driving element, the attachment comprising:

plate means secured to said nose plate to extend bifurcated guide points below said nose plate, said bifurcated guide points defining a generally rectangular guide way for receiving the workpiece therein, said guide way being of a width slightly smaller than the inside width of said wire staples, said plate means being formed of a rigid material with the lower portion including said guide points of said guide attachment plate means being of materially thicker dimension than the upper plate portion thereof to provide a significantly elongated guide shoe defining said generally rectangular guide way receiving said workpiece; and

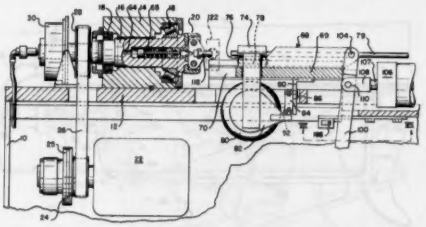
means for fastening said plate means in rigid affixure to the nose plate.

4,087,036

FRICTION WELDING METHOD AND APPARATUS

David A. Corbett, Akron, and Frederick E. Clark, Canton, both of Ohio, assignors to Pemtec, Inc., Greensburg, Pa.

Filed Oct. 14, 1976, Ser. No. 732,521
Int. Cl.[2] B23K *19/02*
U.S. Cl. 228—102 **20 Claims**



1. The method of friction welding of two members comprising the steps of:

(a) rotating one member relative to the other while exerting a first relatively low contact pressure therebetween to provide true mating interface surfaces,

(b) rotating the one member relative to the other member while exerting a second and relatively higher contact pressure therebetween to build up heat in said members in a zone adjacent the interface surfaces of said members to enable welding said members together,

(c) measuring the build-up of heat in said zone in terms of temperature during a first predetermined time and thereafter measuring the temperature in said zone during a second predetermined time commencing upon the attainment of a temperature in said zone appropriate for an acceptable weld,

(d) stopping rotation of said one member relative to the other upon attainment of a temperature in said zone appropriate for an acceptable weld,

(e) then exerting a third and further increased contact pressure between said members to effect welding of said members together,

(f) effecting a fault indication when the temperature in said zone does not reach that appropriate for an acceptable weld during the first predetermined time, and also

(g) effecting a fault indication when a temperature of at least that appropriate for an acceptable weld endures in said zone for a period longer than said second predetermined time.

4,087,037

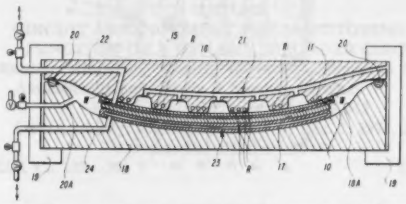
METHOD OF AND TOOLS FOR PRODUCING SUPERPLASTICALLY FORMED AND DIFFUSION BONDED STRUCTURES

Joseph F. Schier, Des Peres, and Robert E. Rosner, Ferguson, both of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Jul. 9, 1976, Ser. No. 704,067
Int. Cl.[2] B23K *19/00*
U.S. Cl. 228—106 **18 Claims**

1. A method of making a metallic structure from a plurality of workpieces capable of being superplastically formed and diffusion bonded, the method comprising: providing at least two shaping members having opposed working face areas with substantially the same contour over said working face areas and one of which is rigid and provided with a forming cavity in its working face area opposed to the working face area of the other one, said other shaping member being flexible, but having substantially greater rigidity than the workpieces when the workpieces are at superplastic forming temperatures; placing two workpieces in facing contact with each other between the opposed working face areas of said shaping members; separat-

ing the contacting faces of said workpieces by application of pressure fluid therebetween to separate and move one of the workpieces and the other one of said shaping members away from said one rigid shaping member; supporting said other shaping member to limit its separating movement; bringing the workpieces up to superplastic forming and diffusion bonding temperature and sustaining that temperature while one workpiece is superplastically conformed to the working face area and cavity of said rigid shaping member by the pressure fluid;



releasing the pressure fluid from between the workpieces; and applying sufficient pressure to the other shaping member to move it toward the rigid shaping member and press the opposed face areas of the workpieces into contact for diffusion bonding of the workpieces except in the areas bridging over the superplastically formed cavity in the one workpiece which follows the working face of and cavity in the rigid shaping member, said pressure being insufficient to deform said other shaping member into the cavity.

4,087,038

FRICTIONAL WELDING METHOD

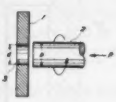
Yutaka Yagi, Aioi, Japan, assignor to Harima Sargyo Kabushiki Kaisha, Japan

Filed Dec. 6, 1976, Ser. No. 747,702

Claims priority, application Japan, Dec. 19, 1975, 50-152407; Apr. 7, 1976, 51-39494

Int. Cl.[2] B23K *21/00*

U.S. Cl. 228—112 **3 Claims**



1. A frictional welding method comprising the steps of forming an opening extending through a first member having a lateral dimension greater than its longitudinal dimension, preparing a second member having a lateral area greater than the area of said opening and a longitudinal dimension greater than its lateral dimension, rotating one of said members with respect to the other of said members about the longitudinal axis of said second member and urging said members into pressure engagement to force said second member into the opening in said first member to produce frictional heat therebetween and soften and deform the contacting portions of both members to form a generally conical welded bond between both members, stopping said rotation and increasing the pressure to complete the weld between the members.

4,087,039

METHOD OF MAKING CATALYTIC CONVERTERS FOR EXHAUST GASES

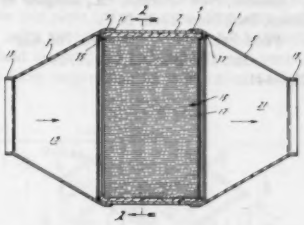
Robert N. Balluff, Rives Junction, Mich., assignor to Tenneco Inc., Racine, Wis.

Continuation of Ser. No. 430,299, Jan. 2, 1974, Pat. No. 3,975,826, which is a division of Ser. No. 207,793, Dec. 14, 1971, Pat. No. 3,798,006. This application Jan. 29, 1976, Ser. No. 653,562

The portion of the term of this patent subsequent to Aug. 24, 1993, has been disclaimed.

Int. Cl.[2] B23K *31/02*

U.S. Cl. 228—173 R **2 Claims**



1. The method of making a catalytic converter for use in the exhaust systems of combustion engines which comprises assembling an annular layer of resilient fibers around the outer periphery of a porous monolithic refractory catalyst element so that an end portion of the layer extends axially a short distance beyond one end of the eklement, inserting the combined element and layer into a tubular metal shell by moving it axially with respect to the shell and positioning it axially in the shell so that an end portion of the shell extends axially a shorte distance beyond said end portion of the layer, bending said end portions of the layer and shell inwardly so that the layer portion extends radially across the adjacent corner of the element to act as a mechanical barrier against axial movement of the element, and attaching inlet and outlet headers to the shell and located respectively at opposite ends of the element to provide for passage of gas through the element by fitting annular end sections at the respective downstream and upstream ends of the headers around the exterior end peripheral surfaces of the shell and welding them thereto.

4,087,040

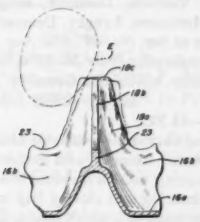
MOLDED CONTAINER FOR FRAGILE ARTICLES

Clifford H. Bessett, South Holland, Ill.; James W. Boyd, Crown Point, Ind., and Theodore H. Misdom, Jr., Lansing, Ill., assignors to Packaging Corporation of America, Evanston, Ill.

Filed Nov. 23, 1976, Ser. No. 744,382

Int. Cl.[2] B65D *1/00, 81/16, 85/32*

U.S. Cl. 229—2.5 EC **5 Claims**



1. A molded container for a plurality of fragile articles, comprising a tray section provided with a plurality of article-accommodating pockets arranged in substantially parallel

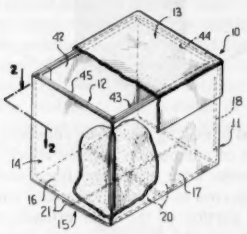
rows, and a plurality of hollow upstanding posts disposed intermediate the pocket rows; a predetermined number of posts each having a plurality of panels, each panel being of substantially uniform thickness throughout and having opposite elongated upright edges thereof hingedly connected to corresponding edges of adjacent panels and forming elongated corners whereby the panel is substantially laterally shiftable about the hingedly connected corner edges thereof when a predetermined transverse force is applied thereto, the lower end portion of each wall panel forming a segment of a surface defining an adjacent pocket.

4,087,041

LINED BULK CONTAINER AND LINER THEREFORE

Michael J. Centanni, New Orleans, La., assignor to The Continental Group, Inc., New York, N.Y.

Filed Feb. 3, 1977, Ser. No. 765,423
Int. Cl.[2] B65D *5/56, 25/14*
U.S. Cl. 220—441 **9 Claims**



1. A liner blank comprising a generally rectangular sheet, a centrally disposed first fold line extending across said sheet and dividing said sheet into two halves offset from one another longitudinally of said first fold line, one half of said sheet having at one side edge a notch extending the full width of said one half to said first fold line and at an opposite side edge thereof from said notch a projecting flap extending from said first fold line the full width of said one half, said notch and said flap being of substantially like sizes whereby when said sheet is folded into doubled relation about said fold lines and remote ends of said halves connected together, said one half will have a juncture line spaced from the juncture line of the other of said halves, first transverse fold lines in said sheet dividing said other half into a plurality of panels combinable to form an enclosure, and second transverse fold lines in said sheet dividing said one half into a plurality of similar panels, like ones of said first and second transverse fold lines being in alignment with one another, said flap being hingedly connected to the remainder of said one half along a transverse fold line aligned with an adjacent side edge of said other half.

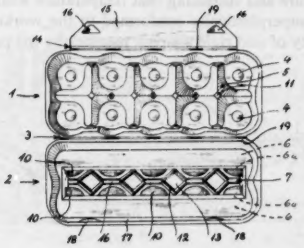
4,087,042

PACKING CARTON FOR BREAKABLE ARTICLES

Bent Moller, Vaerlose, Denmark, assignor to Aktieselskabet Brodrene Hartmann, Lyngby, Denmark

Continuation of Ser. No. 497,670, Aug. 15, 1974, abandoned.
This application May 24, 1976, Ser. No. 689,523
Claims priority, application Germany, Aug. 31, 1973, 2344053
Int. Cl.[2] B65D *1/24*
U.S. Cl. 229—44 EC **8 Claims**

1. A packing carton for breakable articles such as eggs comprising a container member, a lid member, and a closing flap; a hinge line securing said lid member to said container member; a hinge line securing said closing flap to one of said members; said hinge line being of a width substantially equal to the thickness of the carton; said flap, when said lid member is in closed position on said container member, engaging the other of said members; the outside surface of said flap in said closed position lying against the inside surface of one side wall of said other member; at least one fastener projection projecting outwardly from the outside surface of said flap; at least one cooperating fastener opening in said side wall of said other member; said fastener projection when said flap is in said closed position, being engaged in said fastener opening to maintain the carton closed, a plurality of hinge projections jutting from the inner



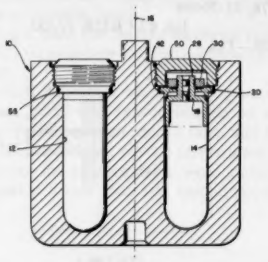
surface of at least one of said hinge lines for controlling and guiding the hinging thereof; said carton being free of any other projections cooperating with said hinge projections that jut from the hinge line; and said carton being of molded pulp construction.

4,087,043

DUAL SEAL ARRANGEMENT FOR A CENTRIFUGE ROTOR TUBE CAVITY

Roger Bruce Anderson, San Jose, and John Robert Edwards, Mountain View, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Aug. 17, 1976, Ser. No. 715,117
Int. Cl.[2] B04B *5/00*
U.S. Cl. 233—26 **1 Claim**



1. A dual seal rotor apparatus comprising:

a rotor having a rotor cavity for receipt of a fluid sample carrying test tube, said cavity having a shoulder;

means recessed within said cavity for capping the open end of said test tube, said capping means establishing a fluid seal around said open end of said tube and having an outside cylindrical rim;

a plug threadably engaged within said cavity above said capping means;

a cylindrical sealing element positioned between said capping means outside cylindrical rim and said cavity;

an upper inward circular flange integral with and extending from said cylindrical sealing element and over the top of said capping means outside cylindrical rim in contacting relation between said plug and said capping means outside cylindrical rim; and

a lower inward circular flange integral with and extending from said cylindrical sealing element and below said capping means outside cylindrical rim in contacting relation between said cavity shoulder and said capping means

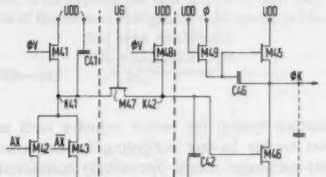
outside cylindrical rim, said lower inward circular flange in conjunction with said plug and said capping means and said tube cavity shoulder forming a first sealing junction, said upper inward circular flange in conjunction with said plug and said capping means forming a second sealing junction, said first and second sealing junctions establishing secondary seals to prevent any of said fluid sample from escaping said rotor when said fluid escapes one of said capping means and said test tube.

4,087,044

CIRCUIT ARRANGEMENT FOR MONITORING THE FUNCTION OF A DYNAMIC DECODER CIRCUIT

Ruediger Hofmann, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 26, 1976, Ser. No. 745,242
Claims priority, application Germany, Dec. 1, 1975, 2553972
Int. Cl.[2] G11C *29/00*
U.S. Cl. 235—301 **5 Claims**



1. A circuit arrangement for simulating the operation of a dynamic decoder circuit which comprises parallel connected capacitively loaded decoder transistors which receive inverted and non-inverted address signals, a pre-charging transistor, switching elements, and a capacitively loaded end stage connected to and disconnected from the decoder transistors via the switching elements to respectively sample the output signal of the decoder transistors and pre-charge the end stage, said circuit arrangement comprising: discharge transistors, simulating the decoder transistors,

connected in parallel and including control inputs

for receiving at least some of the address signals,

and a node at one parallel connection point; a pre-charging transistor connected to said node and to a

voltage supply; a first varactor diode connected between said node and the

voltage supply; a second varactor diode connected between a voltage supply

and said end stage to simulate the capacitive

load of the end stage; and circuit means connected between said second varactor and

said node and corresponding to the switching elements of the decoder.

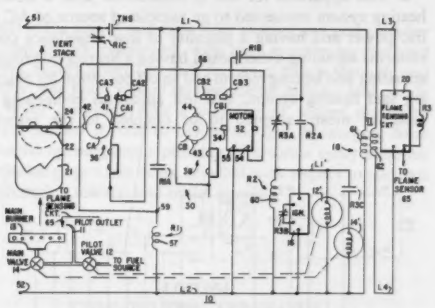
4,087,045

STACK DAMPER CONTROL SAFETY INTERLOCK WITH LOCKOUT PREVENTION

Russell Byron Matthews, Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Filed Sep. 27, 1976, Ser. No. 726,952
Int. Cl.[2] F23N *0/00*; G05D *23/00*
U.S. Cl. 236—1 G **20 Claims**

1. In a heating system including a furnace having a fuel fired burner apparatus, fuel supply means operable when energized to supply fuel to said burner apparatus for combustion to provide heat, a vent stack for conducting combustion products away from said burner apparatus, and stack damper means including a stack damper plate pivotally mounted within said vent stack, said damper plate being normally maintained in a first position to close said vent stack and being rotatable to a second position to open said vent stack, and a drive motor operatively coupled to said damper plate for driving said damper plate between said first and second positions, a control arrangement comprising switching means operable when energized to prepare an energizing path for said fuel supply means, first limit switch means connected in an energizing path for said drive motor to permit energization of said drive motor whenever said damper plate is at said first position, second limit switch means connected in series with said first limit switch means in an energizing path for said switching means to permit energization of said switching means whenever said damper plate is at said first position, activate means responsive to a request for heat to effect the energization of said switching means and said drive motor over said energizing path including said first limit switch means, when said damper plate is at said first position to permit said damper plate to be driven towards said second position, said second limit switch means being operated as said plate is driven away from said first position to interrupt said energizing path for said switching means whereby said second limit switch means prevents said switching means from responding to said activate means whenever



said damper plate is at a position other than said first position, said first limit switch means being operable when said damper plate has been driven to said second position to interrupt said second energizing path and to complete said energizing path for said fuel supply means to effect energization of said fuel supply means, said activate means being operable when the heating demand has been met to deenergize said fuel supply means and said switching means, permitting said drive motor to be reenergized over a return path to drive said damper plate to said first position, said second limit switch means being operable when said damper plate has been driven to said first position to interrupt said return drive path to effect the deenergization of said drive motor, said switching means including a heat-sensor switch responsive to said activate means to permit the energization of said fuel supply means over said the energizing path for said fuel supply means, said heat sensor switch being operable in the absence of heat from said main burner apparatus within a predetermined interval of time following the energization of said fuel supply means to interrupt the energizing path for said fuel supply means.

4,087,046

TEST APPARATUS

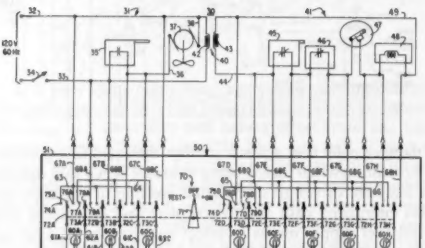
Eugene W. Borucki, Niles, Ill., and Peter P. Zaloga, 5818 W. Newport, Chicago, Ill. 60634, assignors to Peter P. Zaloga, Chicago, Ill.

Division of Ser. No. 499,471, Aug. 22, 1974, Pat. No. 3,970,929. This application Apr. 26, 1976, Ser. No. 680,086
Int. Cl.[2] F23N *5/18*
U.S. Cl. 236—11 **7 Claims**

3. Test apparatus for use in connection with a forced-air heating system connected to an associated source of AC electric power and including a thermostat having a heating condition for actuating said heating system and an off condition for deactuating said heating system, said test apparatus comprising indicator means adapted to be coupled to the associated

source, detector means coupled to said indicator means and to the associated source for detecting the presence or absence of a stream of heated air, said detector means being responsive to the absence of a stream of heated air a predetermined time after movement of the thermostat to the heating condition thereof for energizing said indicator means, and a thermostat-checking circuit connected to the thermostat and to said indicator means and to the associated source and responsive to an open circuit in the thermostat in the heating condition thereof for energizing said indicator means, whereby said test apparatus gives an indication of a malfunction in said heating system, said thermostat-checking circuit including two sets of normally closed switch contacts connected in series with said indicator means and the associated source, and means for opening at least one of said sets of contacts when the thermostat is functioning properly to prevent energization of said indicator means, said switch opening means being disabled in the event of an open circuit in the thermostat in the heating condition thereof thereby to permit energization of said indicator means.

5. Test apparatus for use in connection with a forced-air heating system connected to an associated source of AC electric power and having a plurality of low impedance control elements including a thermostat having a heating condition for actuating said heating system and an off condition for deactuating said heating system, said test apparatus comprising first indicator means adapted to be coupled to the associated



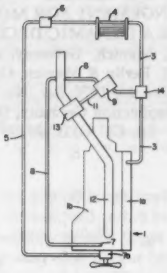
source, detector means coupled to said first indicator means and to the associated source for detecting the presence or absence of a stream of heated air, said detector means being responsive to the absence of a stream of heated air a predetermined time after movement of the thermostat to the heating condition thereof for energizing said first indicator means, a thermostat-checking circuit connected to the thermostat and to said indicator means and to the associated source and responsive to an open circuit in the thermostat in the heating condition thereof for energizing said first indicator means, a plurality of relatively high impedance second indicator means equal in number to and corresponding respectively to the control elements, and a multi-position switch having a plurality of contact banks equal in number to and corresponding respectively to said second indicator means, each of said contact banks including a movable contact connected to one terminal of the corresponding second indicator means, said switch having an indicator-checking position wherein said movable contact of each contact bank is effective to connect the corresponding second indicator means directly across the associated source for indicating the condition of each of said second indicator means, said switch having an analyzing position wherein said movable contact of each contact bank is effective to connect the corresponding one of said second indicator means in parallel with the corresponding one of the control elements for indicating the condition of each of the control elements.

4,087,047

HEATING UNIT FOR AUTOMOTIVE VEHICLES

Helmut Wulf, Ostfildern; Wolfgang Weidemann, Fellbach; Albert Stolz, Tubingen, and Wolfgang Volz, Magstadt, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed May 26, 1976, Ser. No. 689,965
Claims priority, application Germany, May 28, 1975, 2523645
Int. Cl.[2] B60H *1/02*
U.S. Cl. 237—12.3 B **11 Claims**



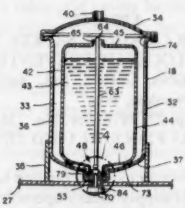
1. A heating system for motor vehicles with an internal combustion engine having a cooling system, comprising a heater heat-exchanger means operatively connected with the cooling system, an inlet line leading from the internal combustion engine at a cylinder head thereof to the heater heat-exchanger means, and a return line connecting the heater heat-exchanger means with the internal combustion engine at a crankcase thereof, said return line leading to a water pump, characterized in that at least one heat conductor means operable to be acted upon by and connected to the exhaust system of the internal combustion engine is provided, said heat conductor means terminates in a flow path of a coolant of the cooling system upstream of the heater heat-exchanger means, a heat-exchanger is provided on at least one end of the heat conductor means, and in that a connecting line is arranged at the crankcase downstream of the water pump as viewed in the flow direction of the coolant, said connecting line extending from the crankcase through the heat-exchanger provided on the heat conductor means and terminating in the inlet line upstream of the heater heat-exchanger means.

4,087,048

SPRAYING APPARATUS

Thomas J. Smrt, 31W 300 W. Bartlett Rd., Bartlett, Ill. 60103

Filed Mar. 1, 1977, Ser. No. 773,199
Int. Cl.[2] B65D *83/14*
U.S. Cl. 239—146 **14 Claims**



1. A spraying apparatus comprising a casing providing an internal chamber adapted to be supplied with pressurized gas, a cartridge within the casing, the cartridge containing contents to be sprayed and having an upper end and a lower end, the upper end of the cartridge above the contents thereof communicating with the chamber so that the pressure of the contents of the cartridge and the pressure within the chamber are sub-

stantially equal, a tube within the cartridge extending into the contents of the cartridge and having an end communicating with the chamber, a valve attached to the tube and communicating with the outside of the chamber, the tube being provided with an opening below the level of the contents of the cartridge and between the valve and said end of the tube, and pressure-reducing means between the opening and said end of the tube for reducing the pressure of gas flowing through the tube whereby when the valve is open the pressure within the tube adjacent to the opening is less than the pressure of the contents of the cartridge and the contents flow through the opening and mix with gas flowing through the tube and the mixed contents and gas flow through the valve to the outside of the chamber.

4,087,049

ABOVEGROUND SPRINKLING DEVICE FOR SPRINKLING SYSTEM

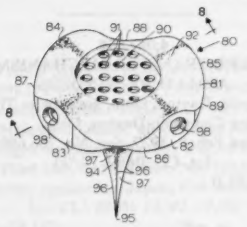
Vincent Joseph Traina, 10 Las Tardes Ct., Novato, Calif. 94947

Continuation-in-part of Ser. No. 641,090, Dec. 15, 1975, abandoned. This application Sep. 23, 1976, Ser. No. 726,001

The portion of the term of this patent subsequent to Nov. 2, 1990, has been disclaimed.

Int. Cl.[2] B05B *1/14*

U.S. Cl. 239—267 **6 Claims**



1. A sprinkling device for use aboveground in a ground-hugging sprinkling system for lawns and gardens utilizing garden hoses, including in combination:

a main housing having a top, a bottom, and side edges and providing an interior crossing, with four sockets in said side edges, disposed at ninety-degree intervals, each adapted to receive a nipple, and each leading into an unpartitioned central chamber at the crossing having a domed upper wall, the height of said chamber at its highest portion being equal to or no greater than the diameter of said socket,

said upper wall being a sprinkler head directly overlying said crossing and at least partially recessed into said housing, and having upwardly and outwardly extending sprinkling openings directly therethrough, and

a holding spike integral with said bottom and extending downwardly, for holding said sprinkling device in place, said spike having four sharp edges, between which lie concave faces, for facilitating installation and for retaining said device in place and against rotary movement.

4,087,050

SWIRL TYPE PRESSURE FUEL ATOMIZER

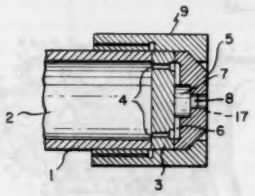
Shoichi Tsuji, Hoya; Minoru Asai, Kamagaya, and Yuichi Fujii, Funabashi, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan

Continuation of Ser. No. 614,447, Sep. 18, 1975, abandoned, which is a division of Ser. No. 405,559, Oct. 24, 1973, abandoned. This application Nov. 18, 1976, Ser. No. 743,013

Int. Cl.[2] B05B *1/34*

U.S. Cl. 239—490 **9 Claims**

1. A burner assembly comprising a housing having a main flow passage therein adapted to receive fuel at one end thereof; a nozzle tip secured to said housing and having an inner wall portion defining a nozzle hole aligned along a nozzle axis; one end of said nozzle hole functioning as an outlet opening for said fuel; a chamber of larger diameter than said nozzle hole and having one end registering with the other end of said nozzle hole; a plurality of grooves extending tangentially to said chamber adjacent the other end thereof; means for receiving said fuel from said main flow passage and dividing said fuel into a plurality of relatively small flow streams extending



parallel to the axis of said main flow passage and said chamber and respectively registering with said grooves so that said grooves impart a swirl to said fuel as it passes through said chamber; said inner wall of said nozzle tip defining said nozzle hole being provided with a plurality of spaced discharge grooves formed therein to divide the fuel discharging from said outlet opening into a plurality of separate spray patterns; said discharge grooves being bevelled with respect to said axis and diverging toward said outlet opening.

4,087,051

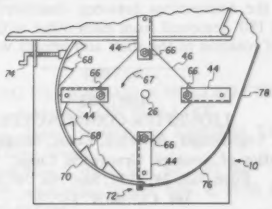
COMMINUTING APPARATUS

Charles E. Moeller, deceased, late of Blackville NSW, Australia (by Linda Kay Moeller, executrix)

Continuation-in-part of Ser. No. 638,600, Dec. 8, 1975, abandoned. This application Feb. 17, 1977, Ser. No. 769,424

Int. Cl.[2] B02C *13/04*

U.S. Cl. 241—27 **7 Claims**



1. Cylindrical tub comminuting apparatus for milling forage or the like comprising, in combination:

circular floor means including a substantially rectangular opening therein, the opening having its longest sides parallel to a radius of said floor, which radius is intermediate said longest sides of said rectangular opening;

rotating means mounted for rotation on an axis beneath said opening, the top of said rotating means moving parallel to said radius;

U-shaped beating means having a shearing edge on one side and mounted on said rotating means for rotating therewith about said axis, said beating means extending through said opening to a point above the upper surface of said floor means during rotation of said rotating means;

means for feeding said forage into said rotating means from the side of said beating means; and

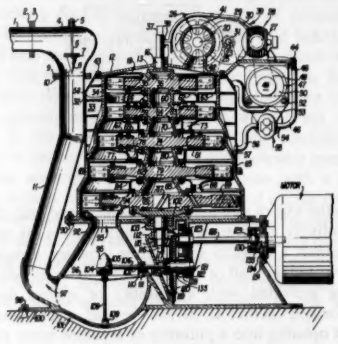
enclosure means, including outlet means, for enclosing said rotating means including said beating means.

4,087,052

VERTICAL IMPACT MILL FOR THE REDUCTION OF FOUR MICRON FINEST POWDER

Hans Rohrbach, deceased, late of Bergen, Germany (by Herta Rohrbach, administratrix), assignor to Ilok Power Co., Inc., Washington, D.C.

Continuation of Ser. No. 586,607, Jun. 13, 1975, abandoned.
This application Jan. 27, 1977, Ser. No. 763,133
Claims priority, application Germany, Jun. 14, 1974, 2428626
Int. Cl.[2] B02C *13/18*
U.S. Cl. 241—65 17 Claims



1. An impact reduction mill for production of fine powder of diameter of about 4 microns, comprising:

a rotatably mounted vertical shaft integral with a plurality of impact wheels rotatable with said shaft;

the smallest of said impact wheels located nearest the top of said mill, with others of said plurality of impact wheels having increasingly greater diameters, the largest diameter impact wheel being nearest the bottom of said mill:

a casing for the mill enclosing said shaft and impact wheels and defining separate chambers for each of said plurality of wheels;

an impact opening at the top of said casing, and connections between each of said chambers for gravitational flow of powder from one chamber to the next lower chamber, with the connections between chambers alternately located 180° removed from each other with respect to the axis of rotation of the shaft and impact wheels.

4,087,053

LIQUEFIER-COMMINUTER

Harry M. Voglesonger, Riverton, Conn., assignor to Dynamics Corporation of America, Greenwich, Conn.

Filed Jan. 24, 1977, Ser. No. 761,474
Int. Cl.[2] B02C *18/12*
U.S. Cl. 241—282.1 10 Claims

1. A liquefier having an upwardly open jar defining a central space that is open throughout its length and bounded by circularly spaced radially recessed side wall portions disposed above a mounting base portion to define contiguous vortexing portions;

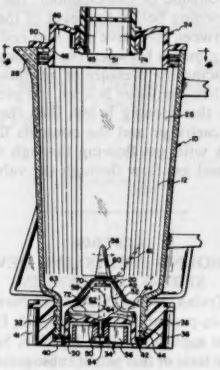
bottom closure means releasably secured to said mounting base portion and including two pairs of radially extending cutter blades;

one pair extending upwardly and outwardly at approximately a 45° angle rotatably supported in said central space, and

the other pair extending downward-and-out with their tips at approximately the lower ends of said recessed side wall portions,

said blades being pitched for impulsion of liquid material in the jar in a downward direction when rotated;

means for journaling the blades for rotation about a vertical axis including a pillar supporting the blades above the lower ends of said recessed side walls and having a plurality of circumferentially spaced recesses of varying radial depths normal to said axis and opening radially outwardly,



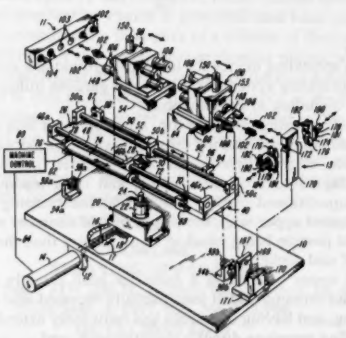
said recesses being of a radial depth less at their circumferentially adjacent ends than at their central portions intermediate their ends.

4,087,054

ARMATURE TRANSFER MECHANISM FOR ARMATURE WINDERS

Hyman B. Finegold, Dayton, Ohio, assignor to The Globe Tool and Engineering Company, Dayton, Ohio

Filed Feb. 8, 1977, Ser. No. 766,690
Int. Cl.[2] B65G *29/00*
U.S. Cl. 242—7.05 B 7 Claims



1. Apparatus for transferring armature forms between a mechanism for supplying said forms and a machine for winding said forms which comprises:

a turret plate disposed between said supply mechanism and said winding machine,

first armature gripping means, said turret plate having first means supporting said first armature gripping means for movement along said turret plate,

second armature gripping means, said turret plate having second means supporting said second armature gripping means for movement along said turret plate,

means for moving said first armature gripping means along said turret plate toward one margin of said turret plate and oppositely toward the center of said turret plate,

means for moving said second armature gripping means along said turret plate toward another margin of said turret plate and oppositely toward the center of said turret plate,

each said armature gripping means comprising a collet

mechanism and means for operating said collet mechanism,

and means for rotating said turret plate from a first position, wherein said first armature gripping means when moved toward said one margin is located adjacent said supply mechanism and said second armature gripping means when moved toward said other margin is located adjacent said winding machine, to a second position reversing the positions of said first and second armature gripping means and for reversely rotating said turret plate to return said first and second gripping means to the first-mentioned position so that said armature gripping means can be used to grip an unwound armature form from said supply mechanism, position said unwound armature form adjacent said winding machine and return to said supply mechanism by repeated operation of said turret plate rotating means.

4,087,055

METHOD AND MEANS FOR MOUNTING A DRIVE ROLL IN A HIGH SPEED WINDER

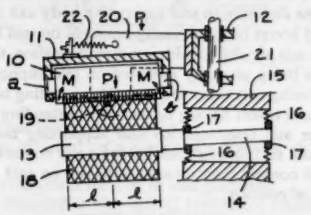
Kazuyoshi Yasuda; Harumi Hasegawa, both of Nagoya, and Yoshihiko Hosokawa, Aichi, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1976, Ser. No. 728,917

Claims priority, application Japan, Oct. 30, 1975, 50-130912

Int. Cl.² B65H *54/42, 54/52*

U.S. Cl. 242—18 DD **2 Claims**



1. In a high speed winder of the surface drive type, including a bobbin holder shaft having a bobbin holder at one thereof, means resiliently supporting said shaft for rotation about the longitudinal axis thereof in order to reduce a resonant point; a motor-containing drive roll a drive roll bracket, said drive roll being journalled in said drive roll bracket for rotation about the longitudinal axis thereof for winding a thread package on the bobbin holder means forcibly pressing said drive roll into surface driving contact with the thread package being wound on the bobbin holder, the bobbin holder shaft and drive roll being substantially parallel, substantially horizontally extending and disposed with their longitudinal axes in the same imaginary substantially vertical plane, the improvement comprising:

pivot means pivotally supporting said drive roll bracket about an axis which forms an imaginary intersection line between an imaginary vertical plane which bisects transversally the thread package being wound and an imaginary horizontal plane at least approximately tangent to the bottom of said drive roll,

so that the press contact force for rotating the bobbin holder shaft from the drive roll is applied entirely through the intermediary of said pivot means.

4,087,056

TEXTILE APPARATUS

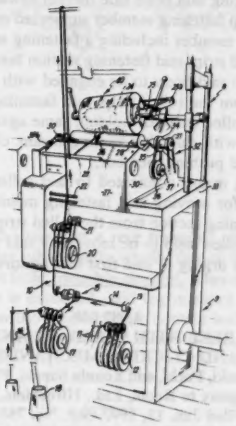
Ronald Wilding, Blackburn, England, assignor to J. & J.A. Porter Limited, Blackburn, England

Filed Aug. 11, 1976, Ser. No. 713,435

Claims priority, application United Kingdom, Oct. 10, 1975, 41553/75

Int. Cl.² B65H *54/30*

U.S. Cl. 242—43 R **5 Claims**



1. A yarn traverse mechanism comprising: a yarn traverse arm, means for positively feeding yarn at a uniform speed to the yarn traverse arm, and arm moving means for moving the yarn traverse arm to and fro axially of a tapered bobbin to lay the yarn on the tapered bobbin to form a package, said arm moving means comprising a cam having a shape correlated with the degree of taper of the bobbin for varying the rate of axial movement of the arm as a function of the axial position of the arm in relation to the cam and thus to the diameter of the bobbin to maintain the tension of yarn laid on the bobbin substantially uniform.

4,087,057

SUPPORTING DEVICE FOR A ROLLED STRIP OF LABELS, OR THE LIKE

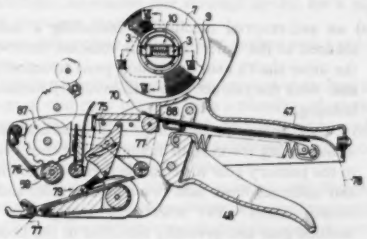
Yo Sato, Tokyo, Japan, assignor to Kabushiki Kaisha Sato Kenkyusho, Tokyo, Japan

Filed Nov. 1, 1976, Ser. No. 737,288

Claims priority, application Japan, Nov. 4, 1975, 50-131438; Feb. 12, 1976, 51-013266

Int. Cl.² B65H *17/02*

U.S. Cl. 242—68.3 **37 Claims**



1. A supporting device for supporting a rolled strip, comprising:

a main body having a first side facing toward a rolled strip, comprising:

a main body having a first side facing toward a rolled strip pushing member;

a rolled strip pushing member having a second side facing toward said body first side and having a third side facing toward a rolled strip to be supported;

first biasing means engaging said pushing member for normally urging said third side thereof toward a rolled strip;

a rolled strip fastening member supported on said body; said fastening member including a fastening section extending to a rolled strip; said fastening section being movable with respect to said body to be engaged with and to be disengaged from the rolled strip; said fastening section engaging the rolled strip for holding same against said pushing member with said first biasing means charged ready to move said pushing member;

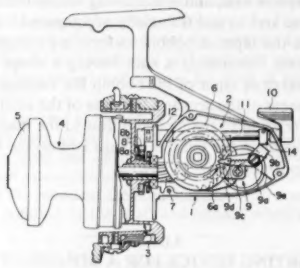
disengaging means connected to said rolled strip fastening member for moving said fastening member to disengage said fastening section from the rolled strip, thereby releasing the rolled strip to be moved by said pushing member under the urging of said first biasing means.

4,087,058

SPINNING REEL WITH SEPARATE ANTI-REVERSAL AND CLICKING MECHANISMS

Tatuya Yamasaki, Fuchi, and Kounin Sazaki, Fukuyama, both of Japan, assignors to Ryobi, Ltd., Hiroshima, Japan

Filed Jan. 12, 1977, Ser. No. 758,881
Claims priority, application Japan, Jan. 14, 1976, 51-3052
Int. Cl.[2] A01K *89/01, 89/02*
U.S. Cl. 242—84.51 A **6 Claims**



1. In a spinning reel including a housing; a primary gear rotatably mounted in the housing; a drive shaft, journalled for rotation in the housing, carrying a pinion gear engaged with the primary gear, and extending out of the housing; and an outer frame secured to the outwardly extending end of the drive shaft for rotation therewith, the improvements comprising:

(a) an anti-reversal mechanism including a ratchet gear secured to the outer frame for rotation therewith about the drive shaft's axis, and a stop pawl selectively engageable with the ratchet gear and pivotally mounted to the housing,

(b) a clicking mechanism for providing an audible clicking sound during rewind and including a toothed gear secured to the primary gear for rotation therewith about a second axis different from said drive shaft's axis, and a spring biased detent pawl selectively engageable with the toothed gear and pivotally mounted to the housing, and

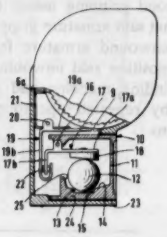
(c) a selection shaft journalled for rotation in the housing and carrying individual cam means for controlling the simultaneous engagement and disengagement of both the anti-reversal mechanism and the clicking mechanism, respectively.

4,087,059

ACTIVATING ORGAN PREFERABLY TO BE USED IN CONNECTION WITH BAND REELS OF SAFETY BELTS FOR VEHICLES

Oskar Lennart Lindblad, Hedasgatan 6, 440 20 Vargarda, Sweden

Filed Dec. 2, 1975, Ser. No. 637,052
Claims priority, application Sweden, Dec. 3, 1974, 7415098
Int. Cl.[2] A62B *35/02;* **B65H** *75/48*
U.S. Cl. 242—107.4 A **9 Claims**



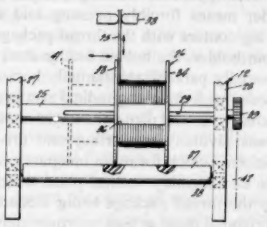
1. An activating organ prefereably to be used in connection with band reels of safety belts for vehicles comprising a frame, a safety belt core rotatably mounted on said frame and having a longitudinal axis of rotation, a locking mechanism being operatively connected to said core and being operable when abnormal changes of the movement of the vehicle takes place, a body of inertia, transmission means being operatively connected to said locking mechanism and said body of inertia, a hollow supporting body being rotatably mounted and having an axis of rotation transverse to said core axis of rotation, said body of inertia being supported by and in said supporting body, said transmission means including two levers each having two lever arms, and each having one of its lever arms extending in a cross-wise direction to said supporting body axis of rotation, one of said levers being pivotally mounted on said frame with a pivoting axis parallel to said core axis of rotation, the other of said levers being pivotally mounted on said supporting body with a pivoting axis transverse to said supporting body axis of rotation, said levers having further arms extending parallel to each other and transverse to said supporting body axis of rotation, and said further arms having point contact with each other, said contact point being positioned on said supporting body axis of rotation.

4,087,060

SELF LEVEL WIND CABLE STORAGE REEL

Elmer Laky, Cranford, and Ralph Walsh, Oceanport, both of N.J., assignors to Breeze Corporations, Inc., Union, N.J.

Filed Oct. 12, 1976, Ser. No. 731,851
Int. Cl.[2] B65H *57/28*
U.S. Cl. 242—158 R **1 Claim**



1. A self level wind device for a cable comprising an elongated bearing member, spaced supports at each end of the

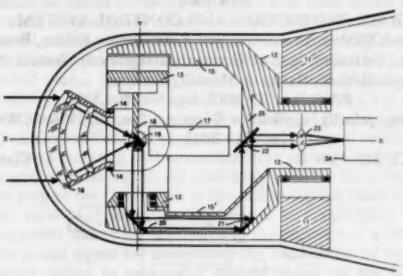
bearing member to rotatably secure the bearing member, a reel coupled to and axially movable with respect to the bearing member, a drum portion on said reel, flanges at each end of the drum portion, a plurality of spaced annular grooves said grooves having a depth no greater than the diameter of the cable in the drum to receive the cable, a longitudinal recess in the surface of the drum extending across the grooves, said recess having a depth at least equal to the bottom of the grooves in the drum, a fixed position cable guide spaced from the drum to direct the cable on to and away from the said drum, an elastomeric roller adjacent the reel, said roller being freely carried at its ends, parallel with the longitudinal axis of the drum and in frictional contact with the flanges whereby the elastomeric roller surface is compressed beneath the flanges as the reel is rotated and, said flanges axially displace to assume a helical path as a result of an axial force imposed by the cable as it moves across the recess and which results in a self-level wind effect, and a source of rotary power coupled to the elongated bearing member to drive the reel.

4,087,061

WIDE ANGLE SEEKER

Warren T. Burt, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 8, 1972, Ser. No. 251,486
Int. Cl.[2] G02B *23/02*
U.S. Cl. 244—3.16 **2 Claims**



1. An optical system comprising:
a platform mounted on a support for rotation about a first axis;
an objective system secured to said platform;
a mirror mounted in the optical system for rotation about said first axis;
the reflecting surface of said mirror containing said first axis; the objective system being so located that the focal point thereof lies on said reflecting surface and the first axis passing through said focal paint; and
a driving connection between the mirror and the platform whereby the angular movement of the mirror is related to that of the objective system so that an incident beam received at said objective system is projected by said mirror along a second axis which is fixed in position with respect to the support.

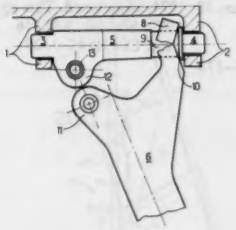
4,087,062

AIRCRAFT UNDERCARRIAGE INCLUDING A SAFETY DEVICE HAVING A PREDETERMINED BREAKING LOAD

Jean Masclet, Paris, France, assignor to Messier-Hispano, S.A., Montrouge, France

Filed Apr. 1, 1977, Ser. No. 783,548
Claims priority, application France, Apr. 22, 1976, 76 11902
Int. Cl.[2] B64C *25/08*
U.S. Cl. 244—100 R **6 Claims**

1. In an undercarriage, for an aircraft having on the frame thereof a front mounting and a rear mounting for mounting the undercarriage, a rigid element and a leg member, said rigid element to be mounted in and to extend between said front and rear mountings to form an axle about the axis of which said leg member of the undercarriage can be pivoted for raising and lowering the undercarriage, said axle being held rigid with said leg member by a front frangible element which will fracture



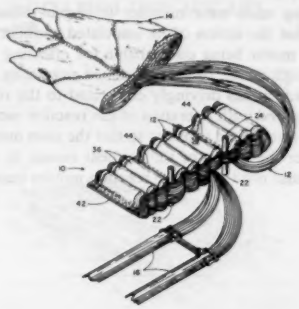
under determined stress and a rear frangible element which will fracture, under substantially wholly flexion stress, following fracture of the front frangible element, whereby when said determined stress is exceeded, said leg member can separate from the aircraft without coming into contact with elements of the frame of the aircraft, said rigid element remaining in position on the aircraft.

4,087,063

PARACHUTE SUSPENSION LINE STOWAGE DEVICE

Larry G. Caffey, Holtville, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 6, 1977, Ser. No. 804,032
Int. Cl.[2] B64D *17/40*
U.S. Cl. 244—148 **7 Claims**

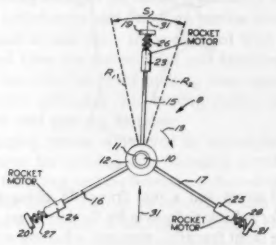


1. A parachute suspension line stowage device for a parachute pack container comprising:
a rigid supporting plate having a first surface and a second surface;
flexible fabric material intermittently secured to each of said surfaces of said rigid plate to form a plurality of laterally arranged open-ended individual pockets, each pocket capable of releasably supporting a different portion of a plurality of looped suspension lines;
means on said supporting plate for securing said device in spaced relation within said container with the longitudinal centerlines of the pockets extending in the same direction as the parachute withdrawal force on the suspension lines;
whereby said suspension lines can be releasably supported within the parachute pack more compactly and without danger of being cut as they are withdrawn during deployment.

4,087,064
ORBITAL PROPULSION APPARATUS

George Knap, 4408 Wildwood Crescent, Burnaby, British Columbia, Canada (V5G 2M4)

Continuation-in-part of Ser. No. 727,036, Sep. 27, 1976, abandoned, which is a continuation-in-part of Ser. No. 623,388, Oct. 17, 1975, abandoned, which is a continuation of Ser. No. 452,078, Mar. 18, 1974, abandoned. This application Jul. 29, 1977, Ser. No. 820,146
Int. Cl.[2] B64G *1/20*
U.S. Cl. 244—172 1 Claim



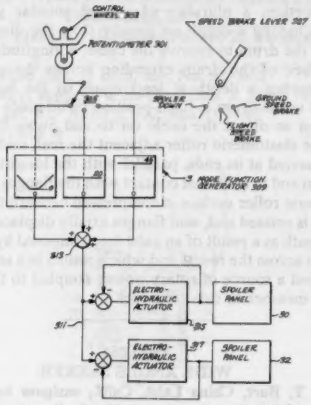
1. Orbital propulsion apparatus comprising:
(a) a rotor having a rotational axis,
(b) a plurality of arms radiating from the rotor,
(c) a mass member mounted on each arm for rotation therewith and freely movable longitudinally of each arm,
(d) yieldable resilient means reacting against the outer end of each arm and each mass member normally urging the mass members radially inwards for resiliently restraining radial outward movement of the mass members so that the mass members normally rotate in a common circular orbit when the rotor rotates at a pre-determined velocity,
(e) a reaction motor mounted on each mass member for urging each mass member to move radially outwards against the action of its associated resilient means, each said motor being controllable for effecting its operation through an arc of predetermined angularity,
(f) motor means drivingly connected to the rotor and synchronized with operation of the reaction motors to maintain rotor speed constant so that the mass members return, under the action of the resilient means, to the common circular orbit when the reaction motors cease operation.

4,087,065
ELECTRICAL CONTROL SYSTEM FOR ACTUATING INBOARD SPOILERS ON AIRCRAFT

Willard Dale Arnquist, Bellevue, and Melvin John Roalsvig, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Feb. 4, 1977, Ser. No. 765,520
Int. Cl.[2] B64C *13/04, 13/50*
U.S. Cl. 244—836 3 Claims

1. An electrical control system for actuating inboard spoilers on the wings of an aircraft comprising:
first means responsive to lateral control information provided by pilot control wheel of the aircraft for providing a first signal;
second means responsive to pilot speed brake lever positioning for providing a second signal;
third means including a three mode function generator responsive to said first and second signals for providing an

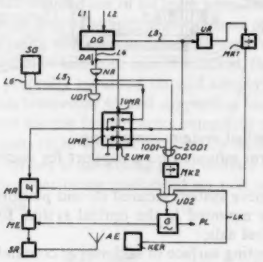


output control signal for actuating said inboard spoilers simultaneously in a modulated manner.

4,087,066
TRAIN PROTECTION AND CONTROL SYSTEM

Friedrich Bähker, Brunswick, and Ernst Jürgen Köhler, Brunswick, Veltenhof, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jun. 10, 1977, Ser. No. 805,307
Claims priority, application Germany, Jun. 28, 1976, 2628905
Int. Cl.[2] B61L *3/12*
U.S. Cl. 246—167 R 11 Claims



1. In a train safety and control system having at least one transmitter disposed at the railway right-of-way for the transmission of orders necessary for train traffic control and for the wireless exchange of general information between a track control center and trains moving in the associated right-of-way section, with a data processing unit being provided at the track control center for the cyclical determination of orders in the form of dynamic signals, the combination of monitoring means at the track control center for monitoring the issuance of dynamic signals from the data processing unit, to determine the availability of the data processing unit, a pilot sound generator operatively connected to said monitoring means for supplying a pilot sound signal in the presence of such dynamic signals, switching means having an input for receiving control orders, an input for receiving radio messages, and an output for selectively supplying either to the transmitter, and means for selectively actuating said switching means in accordance with the type of transmission to be effected, whereby the signals of the pilot sound generator on board the traction vehicle, in conjunction with separate switching means, controls the delivery

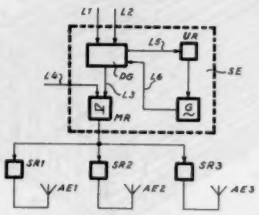
of received control orders to responsive control means on the traction vehicle.

4,087,067

TRAIN PROTECTION AND CONTROL SYSTEM

Friedrich Bähker, Brunswick, and Ernst Jürgen Köhler, Brunswick, Veltenhof, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jun. 10, 1977, Ser. No. 805,599
Claims priority, application Germany, Jun. 28, 1976, 2628942
Int. Cl.² B61L *3/12*
U.S. Cl. 246—167 R **5 Claims**



1. In a train safety and control installation having at least one transmitter disposed at the railway right-of-way for the transmission of orders necessary for train traffic control and for the wireless exchange of general information between a track control center and trains moving in the associated right-of-way section, with a data processing unit being provided at the track control center for the cyclical determination of orders, the combination of monitoring means at the track control center for monitoring the operational availability of the data processing unit, operative, at a predetermined operational readiness of the data processing unit to continuously activate a pilot sound generator whose signals are conducted over the same transmission path of the transmitter as the orders for the traction vehicles, receiving means on the vehicle and switching means cooperable therewith responsive to the presence of a received pilot sound signal for controlling the conduction of received control orders to responsive control means on the traction vehicle.

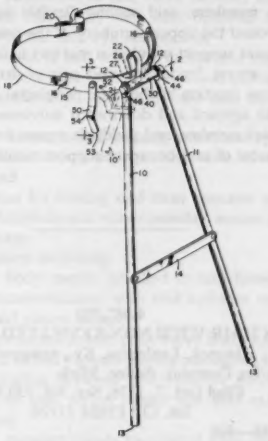
4,087,068

GOLF BAG SUPPORT

Leo Max Gardner, 1619-184th NE., Bellevue, Wash. 98008

Filed Aug. 13, 1976, Ser. No. 714,175
Int. Cl.² A63B *55/00*
U.S. Cl. 248—96 **1 Claim**

1. A support device for a golf bag, comprising:
two legs, each leg having first and second ends;
means for connecting said legs intermediate their first and second ends, and maintaining said legs in fixed coplanar divergent relation from their first ends;
attachment means including a collar for attaching the support device to a golf bag;
connecting means including a pivot mounted by said collar for pivotally connecting said legs at their first ends to said attachment means such that said legs may swing about said pivot between an extended position for support of the bag and a retracted position adjacent the bag, said pivot being of sufficiently low friction that said legs may be swung freely between their advanced and retracted positions by at least a gravitational force; and
restraining means acting between said collar and said legs for restraining said legs in their retracted position, said restraining means comprising an elongated member having first and second ends and an intervening portion, said elongated member being pivotally connected adjacent its first end to the collar at a location spaced from said pivot for movement to and from a restraining position in which its second end engages one of said legs only when said legs are in their retracted position, and said intervening portion including a portion which projects outwardly from the



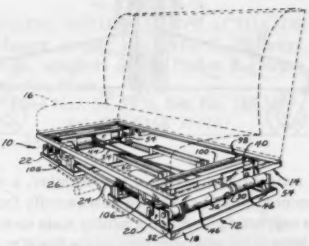
golf bag between said first and second ends a distance sufficient that it may be engaged in order to swing said elongated member to and from its restraining position independently of the bag and said legs.

4,087,069

SUSPENSION SYSTEM FOR WIDE SEAT

Garth O. Hall; Harvey N. Tengler, both of New Berlin, and Narendra J. Shah, Milwaukee, all of Wis., assignors to UOP Inc., Des Plaines, Ill.

Filed Jun. 23, 1976, Ser. No. 699,115
Int. Cl.² F16M *11/00*; A47C *3/22*
U.S. Cl. 248—400 **13 Claims**



1. In a suspension system for providing isolation from vertical vibrations to an occupant support member which is adapted to be mounted for vertical reciprocatory movement relative to the body of a vehicle, the improvement comprising a pair of parallel, spaced apart drum members adapted to be mounted relative to said body for rotation about axes which are located under said support member and inwardly of a pair of opposed sides thereof; a plurality of first and second flexible support members fixed at one end thereof to each of said drum members and fixed at the other end thereof to first and second mounting members which are fixedly mounted relative to said occupant support member adjacent each of said drum members and at spaced locations along the length thereof, said first flexible support members each being fixed at their said other end to portions of said first mounting members which are positioned above said drum members, said first flexible support members passing around the lower periphery of the nearest

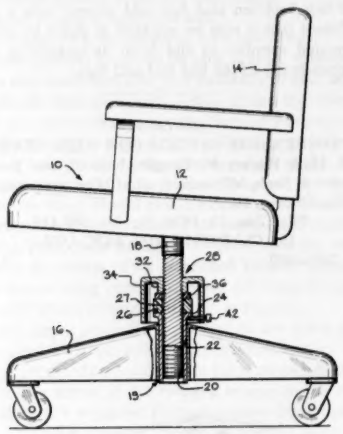
drum when said occupant support member is midway in its range of vertical travel, said second flexible support members being fixed to portions of said second mounting members which are at all times positioned below the plane of the axes of the drum members, said second flexible support members passing around the upper periphery of the nearest drum when said occupant support member is midway in its range of vertical travel, means for joining said pair of drum members for simultaneous rotation at the same peripheral surface speed in response to upward and downward movement of said occupant support member, and yieldable means for resisting vertical movement of said occupant support member.

4,087,070

SWIVEL CHAIR WITH NON-KEYWAYED MAIN SCREW

William L. Hancock, Lexington, Ky., assignor to Hoover Ball and Bearing Company, Saline, Mich.

Filed Oct. 7, 1976, Ser. No. 730,380
Int. Cl.² F16M *11/26*
U.S. Cl. 248—406 **3 Claims**



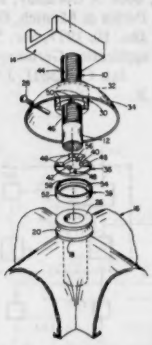
1. In a swivel chair having a seat member, a main screw member secured to and extending downwardly from said seat member, a supporting base, and a tubular main screw mounting assembly located on said base, said screw being positioned for rotational movement in said mounting assembly, a washer positioned concentrically on said mounting assembly and formed of material having a low coefficient of friction, a ring shaped member frictionally mounted on said screw so that in the absence of external forces thereon said ring shaped member is maintained in a fixed position on said screw during rotation of said screw, said ring shaped member being positioned concentrically on said washer in contact with the top surface thereof and being formed of material having a substantially higher coefficient of friction than the material from which said washer is formed, and a nut threadably mounted on said screw at a position above and in contact with the top side of said ring shaped member so that rotation of said seat and screw causes identical rotation of said ring shaped member and said nut, thereby precluding any change in the vertical position of said seat as a result of rotation thereof, only relative rotation of said screw and said nut being effective to cause raising or lowering of said seat.

4,087,071

CHAIR HEIGHT LIMIT STOP

James A. Parker, Orange, Mass., assignor to Collier-Keyworth Company, Gardner, Mass.

Filed Feb. 7, 1977, Ser. No. 766,627
Int. Cl.² F16M *11/24*
U.S. Cl. 248—406 **7 Claims**



1. A swivel chair support construction comprising:
a spindle having one end adapted for attachment to a chair seat, at least the upper portion of said spindle being threaded for a sufficient distance to provide vertical adjustability of the chair position;
a load supporting nut threadedly engaged on said spindle;
a keyway extending along the threaded portion of said spindle and terminating at a lower end below said nut a distance spaced above the lower end of said spindle; and
limit stop means engaging said keyway between said nut and the keyway lower end;
the improvement in which said limit stop means comprises:
a split ring washer on said spindle having an inner diameter corresponding to the diameter of said spindle and having a key extending into said keyway, said washer being resiliently deformable for assembly and disassembly about said spindle; and
an annular retainer member engageable with said washer for restraining said washer against deformation, said annular retainer comprising a flange disposed under said washer, said flange having an inner diameter at least as large as the diameter of said spindle and said retainer having an integral cylindrical wall extending upwardly from said retainer around said washer, said cylindrical wall having an inner diameter corresponding to said washer outer diameter.

4,087,072

FORM MEANS FOR FABRICATING PRE-CAST STRUCTURAL PANELS

Audun P. Olsen, 13 Aldrich Ct., Bay Shore, N.Y. 11706

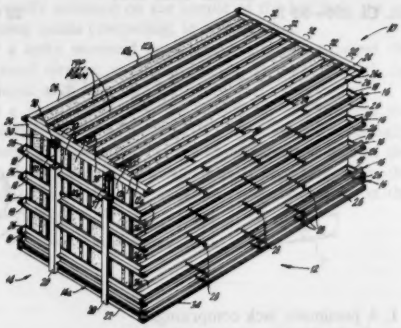
Filed Feb. 22, 1977, Ser. No. 770,940
Int. Cl.² B28B *7/24, 7/2, 7/20*
U.S. Cl. 249—129 **30 Claims**

1. Form means for forming pre-cast structural panels, which, when assembled, comprises:
a form box having a pair of generally opposed side wall assemblies and a pair of generally opposed end wall assemblies defining a generally hollow space interior thereof, each said end wall assembly comprising:
an end wall frame adapted to provide structural rigidity for said end wall assembly, and
a plurality of end separator panels, each end separator panel adapted to be releasably attached to said end wall frame for forming said end wall assembly, adjacent end separator panels on said end wall frame being adapted

to retainingly support structures positioned therebetween;

a bottom assembly generally abutting bottom portions of said end and side wall assemblies;

divider means positioned within said form box to define a desired number of form compartments in said form box, said divider means being supported in desired position between adjacent end separator panels; and



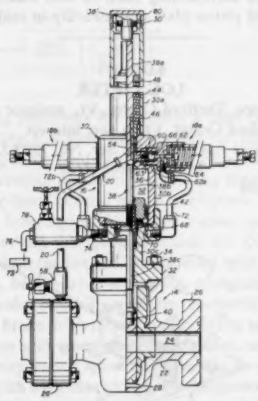
releasably coupled collar means surrounding said form box generally against the exterior surfaces of said end and side wall assemblies for supporting said wall assemblies, such that said form box is retained in assembled configuration by said collar means, with said collar means urging said end separator panels towards each other to retain said divider means in desired configuration.

4,087,073

SAFETY VALVE WITH A HYDRAULIC ACTUATOR

James E. Runberg, and Karl N. Tunstall, both of Dallas County, Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Apr. 26, 1976, Ser. No. 679,892
Int. Cl. F16k *31/122*
U.S. Cl. 251—28 **6 Claims**



1. In combination

main valve means including:

main valve body means having flow passage means therethrough,

said valve body means adapted to be connected into a flow line, and

valve member means movable between positions opening and closing said flow passage;

hydraulic actuator means including:

housing means connected to said main valve body means, said housing means including cylinder means,

stem operator means disposed in said housing means and operably connected to said valve member means,

piston means carried by said stem operator means and disposed within said cylinder means,

first port means in said housing means and opening into said cylinder means on one side of said piston means to permit conduction of control fluid into said cylinder means,

second port means in said housing means and opening into said cylinder means on the other side of said piston means, and

biasing means for biasing said stem operator means to a position wherein said valve member means closes said flow passage;

pilot valve means including:

pilot valve body means attached to said housing means and in communication with said cylinder on said one side of said piston means;

exhaust port means in said pilot valve body means,

said pilot valve body means having passageway means for communicating between said cylinder means on said one side of said piston means and said exhaust port means, and

pilot valve member means to control flow through said passageway means,

said pilot valve member means preventing flow through said passageway means when fluid pressure in said cylinder means on said one side of said piston means is within an acceptable range and permitting flow when said fluid pressure is no longer within an acceptable range; and

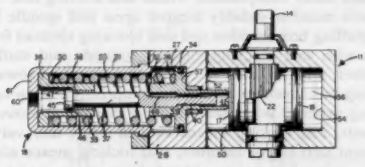
communicating means extending between said exhaust port means and said second port means for communicating fluid between said exhaust port means and said second port means and for equalizing the fluid pressure on opposite sides of said piston means when the pilot valve means permits flow through said passageway means.

4,087,074

SPRING RETURN VALVE ACTUATOR

Roger G. Massey, Exeter, and David G. Holloway, Concord, both of N.H., assignors to The Parker & Harper Mfg. Co., Inc., Worcester, Mass.

Filed Nov. 26, 1976, Ser. No. 745,367
Int. Cl.[2] F16K *31/163*
U.S. Cl. 251—58 **4 Claims**



4. A power actuated ball valve with spring return comprising:

(a) a ball valve;

(b) a fluid power actuator coupled to said ball valve comprising:

(1) an actuator body enclosing two opposed cylinders;

(2) a stem carrying longitudinally arranged gear teeth mounted between said two cylinders for rotation in said body;

(3) first and second opposed pistons each having a partial skirt with an internal gear rack meshing with said gear teeth, said pistons arranged to reciprocate within said body;

(4) a first passage in a wall of said body connecting outside ends of said two cylinders;

(5) a second passage in a wall of said body connecting the interior of said body to one end of said body; and,

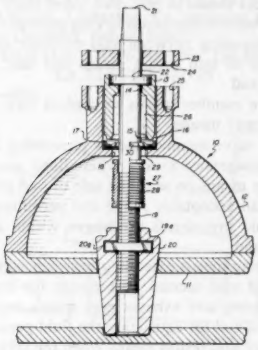
(c) a spring return assembly mounted to said one end of said body and including a spring, a fluid actuated piston coupled to said spring located in a cylinder connected both to an external fluid power connection and to said second passage whereby applied fluid pressure can be utilized simultaneously for driving said spring into compression and actuating said ball valve.

4,087,075

VALVE ASSEMBLY

Iwa Nechanicky, 73 Willowdale St., Sault Ste. Marie, Ontario, Canada

Filed Sep. 2, 1976, Ser. No. 720,173
Claims priority, application Canada, Apr. 22, 1976, 250795
Int. Cl. F16k *31/50*
U.S. Cl. 251—214 **7 Claims**



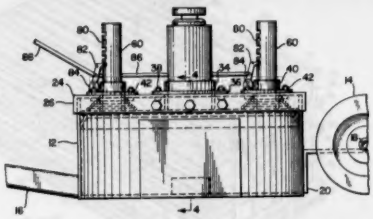
1. A valve assembly comprising a valve body including a valve conduit, a valve housing and a stuffing box chamber within said housing, a valve spindle passing through said housing and said stuffing box chamber, a valve conduit blocking element located at one extremity of said spindle, said spindle being free to rotate in a clockwise or counterclockwise direction to move said blocking element towards or away from said stuffing box chamber in accordance with the direction of rotation of said spindle and to vary the extent of penetration of said blocking element into said valve conduit, a packing material retained under compression within said stuffing box chamber, a sleeve member slidably located upon said spindle between said stuffing box chamber and said blocking element for movement with said blocking element towards said stuffing box chamber, whereby said sleeve member is urged towards said stuffing box chamber to exert a compressive force upon said sealing material when said blocking element is moved therewards, and locking means located upon said valve body adjacent said sleeve member, said locking means adapted to cooperate with complementary formations upon said sleeve to permit movement of said sleeve towards said sealing material and to prevent movement of said sleeve away from said material, said complementary formations comprising serrations of generally saw-tooth or ratchet-tooth cross-section extending annularly of said sleeve member and having leading edges flared outwardly away from the direction of travel of said sleeve toward said sealing material, and said locking means comprising an internally annular member through which said sleeve member passes, said internally annular member having an inwardly extending annular surface region remote from said packing material and sloping at an angle approximating that of said leading edges of said serrations, said serrations or said annular member having sufficient flexibility to yieldingly permit passage of said serrations through said annular member and to snap into locking engagement between said annular member and the trailing edges of said serrations.

4,087,076

PNEUMATIC JACK

Stewart W. Getty, Cornelia, Ga., assignor to Dorothy A. Getty, Cornelia, Ga.

Filed Nov. 16, 1977, Ser. No. 851,876
Int. Cl.² B66F *3/30*
U.S. Cl. 254—93 R **20 Claims**



1. A pneumatic jack comprising:

a cylinder having a removable cover,

an inlet for pressurized gas near the bottom of said cylinder,

a piston plate within said cylinder and position for vertical movement therein,

a resilient piston cup connected to said piston plate and having a skirt portion in sealing engagement with the inside wall of said cylinder,

said cover including a central piston rod bushing and at least two laterally offset stabilizer rod bushings, said bushings extending above said cover and below said cover into said cylinder,

a piston rod secured to said piston plate and extending through said piston rod bushing,

at least two stabilizer rods secured to said piston plate and extending through said stabilizer rod bushings, said stabilizer rods and said piston rod being perpendicular to said piston plate, and

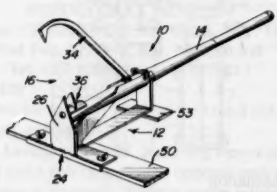
spring means surrounding each of said stabilizer rods for urging said piston plate downwardly in said cylinder.

4,087,077

LOG LIFTER

Charles E. Vance, Thetford Center, Vt., assignor to Mildred B. Vance, Thetford Center, Vt., a part interest

Filed Apr. 21, 1977, Ser. No. 789,672
Int. Cl.² B66F *7/22*
U.S. Cl. 254—94 **6 Claims**



1. A support assembly for use with a conventional log jack including a handle and a hook pivotally mounted on the handle for facilitating the lifting of logs, and the like, comprising, in combination:

(a) an L-shaped bracket having a pair of substantially perpendicularly extending legs;

(b) a stand element mounted on one of the legs of the bracket and arranged extending from the one of the legs codirectionally with and substantially parallel to the other of the legs of the bracket;

(c) socket means mounted on and extending between the other of the legs of the bracket and the stand element for receiving a handle of a log jack; and

(d) retaining means for selectively engaging and holding an article on the support assembly in cooperation with a hook pivotally mounted on the handle of the log jack, the retaining means comprising, in combination:

(1) a spike mounted on the socket means adjacent the stand element and arranged for cooperating with the hook of the log jack for retaining an article; and

(2) a point formed on the stand element adjacent the socket means and arranged extending codirectionally with the spike and with the other of the legs of the bracket, the point selectively cooperating with the spike, and with the hook, to retain an article on the support assembly.

4,087,078

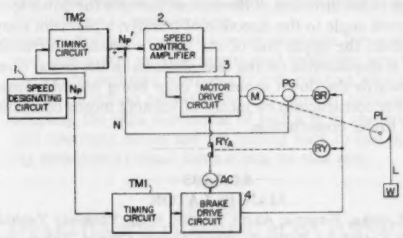
MOVING APPARATUS FOR A LOAD

Masami Joraku; Koji Yamauchi, both of Hitachi; Shigeyoshi Kawano, Hitachiota, and Masahiro Ueno, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 14, 1976, Ser. No. 677,059

Int. Cl.² B66D *1/48*

U.S. Cl. 254—173 R **1 Claim**



1. A moving apparatus for moving a load comprising lift meand for lifting the load, drive means for driving said lift means, driving-force control means for energizing said drive means, speed control means for controlling the output energy of said driving-force control means in response to designated speed signals from speed designator means, speed detector means for detecting the speed at which the load is lifted or lowered, brake means for holding the load with a mechanical braking force, brake drive means for energizing said brake means, and brake control means for controlling the output energy of said brake drive means in response to speed designating signals from said speed designator means, said brake control means incorporating a first timing means for actuating said brake means with a lag in response to a designated speed signal for zero speed; further comprising a second timing means, interposed between said speed designation means and said speed control means, for imparting a time lag to the rise and fall times of the designated speed signals, wherein the rise motion of the second timing means lags behind that of the first timing means at the rise of the designated speed signal and the fall motion of said first timing means lags behind that of the second timing means at the fall of the designated speed signal for zero speed.

4,087,079

MIXING APPARATUS

Walter Kramer, Lussirain 6, Zug, Switzerland

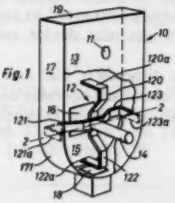
Filed Jan. 17, 1977, Ser. No. 760,242

Claims priority, application Switzerland, Jan. 22, 1976, 779/76

Int. Cl.² B01F *7/02*

U.S. Cl. 366—131 **14 Claims**

Fig. 1



1. An apparatus for continuous distribution of an additive material in a particulate solids master or base material, said apparatus comprising a chamber having arranged therein distributor means for rotation around a substantially horizontal axis and defining a circular path in a substantially vertical plane, said path having a peripheral upper horizontal tangent line substantially defining the maximum charge level of said chamber, a first inlet for feeding said master or base material into said chamber, at least one second inlet for feeding said additive material into said chamber, and an outlet for a stream of said master or base material with said additive material dispersed therein, said outlet being located in the bottom part of said chamber, said first inlet for said master or base material being disposed below said peripheral upper horizontal tangent line of said circular path and said second inlet for said additive material being disposed at a distance above said maximum charge level defined by said peripheral upper horizontal tangent line of said circular path.

4,087,080

APPARATUS FOR FILTERING METAL MELTS

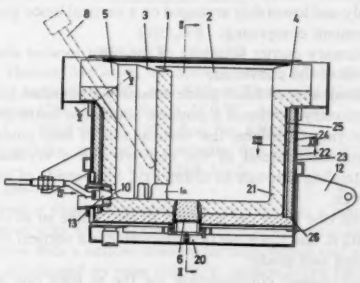
Alfred Steinegger, Venthone, and Robert Moser, Steg, both of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Feb. 5, 1976, Ser. No. 655,535

Claims priority, application Switzerland, Apr. 29, 1975, 5517/75

Int. Cl.² C21C *7/00*

U.S. Cl. 266—88 **6 Claims**



1. An apparatus for filtering a metal melt, comprising in combination:

a filter chamber adapted to contain filter material and to receive in a downward flow the molten metal, said filter chamber including a first lower portion having at least one gas inlet device adapted to admit a nonreactive gas in counter-current into the descending molten metal;

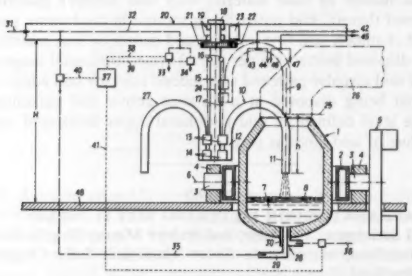
a riser chamber having a second lower position;
a dome-shaped cover for said chambers;
a hydrocarbon burner mounted in the cover and operable to heat said chamber from above;
means defining a transfer conduit interconnecting said chambers interiorly, operable to admit of the passage of liquid and adapted to restain the passage of filter material from the filter chamber into the riser chamber;
an electronic controller arranged to control the supply of gas to both the gas inlet device and the hydrocarbon burner, and
a thermo-element disposed in said riser chamber near said second lower portion and operably connected to transmit temperature measurements to said controller.

4,087,081

PLANT FOR REFINING MOLTEN PIG IRON

Eduard Michaelis, Seewalchen, Austria, assignor to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Dec. 1, 1976, Ser. No. 746,235
Claims priority, application Austria, Sep. 30, 1976, 7243/76
Int. Cl.² C21C *5/32, 5/34*
U.S. Cl. 266—142 **4 Claims**



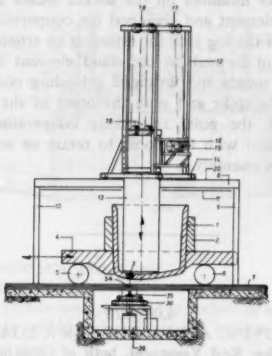
1. In a plant for refining molten pig iron with a converter surrounded by a carrying ring and tiltable around a horizontal axis by oppositely arranged carrying trunnions supported in bearings and with at least one water-cooled blowing lance that is liftably and lowerably arranged on a vertical lance guide, the improvement comprising:
a stationary carrier structure of the plant located above the level of the converter;
a column-shaped lance guide rotatably suspended from said stationary carrier at a position above the bearings of the carrying trunnions, the vertical axis of said guide being positioned lateral of the converter in a vertical plane extending through its tilting axis, but outside of its tilting range;
at least one lance car attached to said guide so as to rotate with it, said lance car being movable in a vertical direction along said guide;
a hook-shaped configuration for the at least one blowing lance so that it has an inverted U-shape with an upper curved base section and two downwardly extending legs, one leg of the at least one blowing lance being rotatably mounted in said at least one lance car so that it can be lifted from or lowered into the converter mouth, said guide having a length sufficient to enable the lifting of the at least one blowing lance over the converter mouth and;
means for rotating the lance guide around its vertical axis.

4,087,082

DEVICE FOR EXCHANGING AND/OR REPAIRING THE DOWN SPOUT AND SEATING BRICK IN A STEEL LADLE

Jan A. Kleef, and Sytze M. Doorenbos, both of Beverwijk, Netherlands, assignors to Hoogovens Ijmuiden, B.V., Ijmuiden, Netherlands

Filed May 16, 1977, Ser. No. 797,531
Claims priority, application Netherlands, May 25, 1976, 7605585
Int. Cl.² C21C *1/00*
U.S. Cl. 266—281 **4 Claims**



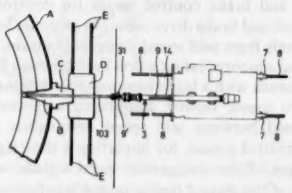
1. Device for exchanging the down spout and repairing a seating brick in a steel ladle, comprising a vertically movable cage and a hoist system therefore, characterized in that the device further comprises a carriage for transferring the ladle along a fixed track, the carriage being adapted to hold the ladle with the radial direction of the bottom towards the down spout at an acute angle to the direction of transfer, a platform above the path of the upper rim of the ladle, a tower construction which is displaceable on the said platform in the radial direction towards the down spout, the cage being hoistable inside the tower construction by means of hoisting means connected to said tower construction.

4,087,083

MANIPULATOR

Goro Kozuka, Nagoya; Akira Matsui, Omi; Yoshiaki Yoshida, Omi; Katsuhiko Fujimoto, Omi; Shigeo Okada, Tokai; Seiji Nonoyama, Aichi; Yukihiko Kato, Nagoya, and Hideshi Hirose, Chita, all of Japan, assignors to A. Daidoseiko K.K., Nagoya and B. Denkikagakukogyo K.K., Tokyo, both of Japan

Filed Jun. 9, 1976, Ser. No. 694,259
Claims priority, application Japan, Jun. 10, 1975, 50-71269; Jun. 10, 1975, 50-71270; Jun. 10, 1975, 50-78483[U]; Jun. 10, 1975, 50-78485[U]; Jun. 10, 1975, 50-79673[U]
Int. Cl.² C21B *7/12*
U.S. Cl. 266—273 **7 Claims**



1. A manipulator comprising:
(i) a support structure
(ii) an arm supported on said support structure, said arm

being hollow and being provided with a central shaft which extends axially through said arm and which is axially movable and rotatable about its own axis, said arm being rotatable in a vertical and in a horizontal plane,

(iii) a hydraulic cylinder connected to one end of said central shaft to axially move said central shaft

(iv) a hydraulic actuator connected to said central shaft to rotate it about its axis

(v) a hollow auxiliary arm connected at one end to said arm and to the other end of said central shaft and rotatable about its own axis upon said rotation of said central shaft,

(vi) means provided on said support structure for rotating said hollow arm in said vertical plane,

(vii) means provided on said support structure for rotating said hollow arm in said horizontal plane,

(viii) a tool holder comprising a rod having one end adapted for insertion in said auxiliary arm, a tool holding member provided on the other end of said rod, and a radially outwardly projecting flange provided on said rod intermediate said ends thereof, said tool holder being adapted to resiliently support a tool relative to said auxiliary arm,

(ix) means carried on said arm for clamping said tool holder to said arm, said clamping means comprising a plurality of clamping fingers connected to the other end of said auxiliary arm and rotatable in a radial plane of said auxiliary arm, and a plurality of links each having one end connected to one end of one of said clamping fingers, the other end of each said link being connected to the other end of said central shaft, said links being axially movable with said axial movement of said central shaft to cause said rotation of said clamping fingers, said auxiliary arm including a radially outwardly extending flange formed at said other end thereof against which said clamping fingers can clamp said tool holder at the other ends thereof to connect said tool holder to said arm, and a plurality of openings formed in said auxiliary arm in the vicinity of said other ends of said links, each of said links extending through one of said openings,

(x) means provided on said support structure for operating said axially arm moving means, said vertically arm rotating means, and said horizontally arm rotating means, and

(xi) a servo system provided on said support structure for adapting the axial movement of said arm to operation of said operating means and for feeding back to said operating means an external force acting on said arm.

4,087,084

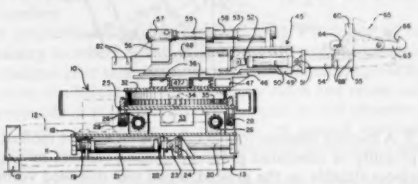
APPARATUS FOR CHANGING BLAST FURNACE TUYERES

Meyers, Leo J., Penn Hills, Pa., assignor to Louis A. Grant, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 626,048, Oct. 28, 1975, abandoned. This application Aug. 24, 1977, Ser. No. 827,179

Int. Cl.[2] F27B *1/10*

U.S. Cl. 266—287 **6 Claims**



1. Apparatus for removing and replacing blast furnace tuyeres and attendant structure comprising:

(a) mobile undercarriage means having uneven ground engaging jack means attached thereto to raise and lower said undercarriage to different fixed levels,

(b) first subcarriage means mounted on said undercarriage movable longitudinally with respect thereto,

(c) second subcarriage means mounted on said first subcarriage and movable laterally with respect to said first subcarriage and said undercarriage,

(d) rotatable platform means mounted on said second subcarriage means and rotatable in relation to said subcarriages and undercarriage means, and

(e) an elongated member movable longitudinally on said rotatable platform means and adapted to carry tool means at each end, and hammer means for impacting said elongated member so as to vibrate it longitudinally.

4,087,085

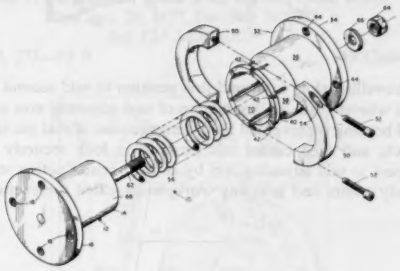
IMPACT DEFLECTION ABSORBER AND STABILIZER

Henry K. Hauser, 828 Beryl, San Diego, Calif. 92109

Filed Aug. 23, 1976, Ser. No. 716,504

Int. Cl.[2] F16F *1/00*

U.S. Cl. 267—135 **6 Claims**



1. An impact deflection absorber and stabilizer comprising:

a base support including a hollow tubular portion having an open end and a closed end;

a cap support including a hollow tubular portion having an open end and a closed end;

said open end of said cap support being disposed over and encompassing at least a portion of said open end of said base support tubular portion such that said cap support and said base support form a generally tubular cavity and such that the inner surface of said cap support and the outer surface of said base support abut to form contacting mating frictional surfaces therebetween;

a helical compression spring positioned within said cavity; and

selectively adjustable clamp means in contact with said cap support open end for adjusting the amount of friction between said contacting frictional surfaces.

4,087,086

TENSION CLAMP

Lindsay Thomas McGrath, 89 Sydney Street, Muswellbrook, N.S.W., Australia (2333), and Gilbert Thomas McGrath, 14 Farrington Close, Caves Beach, N.S.W., Australia

Filed Sep. 6, 1977, Ser. No. 830,401

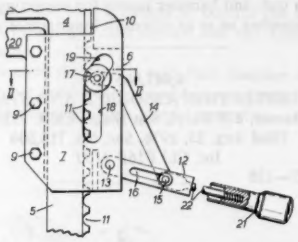
Claims priority, application Australia, Sep. 6, 1976, 7273/76

Int. Cl.[2] B25B *5/12*

U.S. Cl. 269—212 **4 Claims**

1. A tension clamp comprising, in combination, a main jaw co-extensive with an elongated adjusting arm, a movable jaw co-extensive with a hollow housing through which said adjusting arm is adapted to pass freely, a tension lever pivotally attached to and between two side cheeks of said housing, a secondary lever pivotally fastened at one end thereof to said tension lever, the other end of said secondary lever being constrained with respect to said housing by means of a pin in sliding relationship with respect to a pair of registering travelling slots, each formed within a respective one of said side cheeks of said housing, said pin being adapted to engage selectively one of a number of semi-circular notches formed within an edge of said adjusting arm remote from said main jaw, and

said pair of travelling slots being adapted to guide sliding movement of said pin therealong from a first position wherein said pin is free of engagement with said notches to a second position wherein said pin engages said one of said notches, whereby pivotal movement of said tension lever with respect to said housing initially causes said pin to slide along said pair



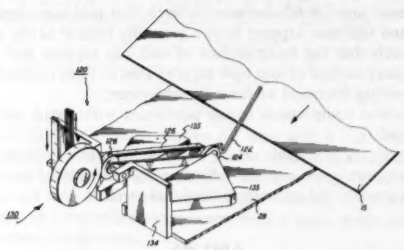
of travelling slots from said first position to said second position whereby free sliding motion of said adjusting arm within said housing is prevented by the engagement of said pin in said notch, and then causes said housing to lock securely with respect to said adjusting arm by an over-center action to grip firmly within said jaws any workpiece located therebetween.

4,087,087

SHEET STACKING APPARATUS FOR SORTER

John H. Looney, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 27, 1977, Ser. No. 763,274
Int. Cl.[2] B65H *31/24, 31/34*
U.S. Cl. 271—173 **5 Claims**



1. Sheet stacking apparatus for a moving bin sorter of the type receiving copy sheets in separately identifiable sets comprising

a frame;

an array of bins moved relative to said frame past a sheet distributing station at which copy sheets are delivered to the bins, each of said bins having a wall member against which sheets can be registered,

sheet stacking means associated with each of said bins for movement therewith including a driven rotary means positioned for applying a predetermined load on an incoming sheet and directing said sheet against said wall member, and

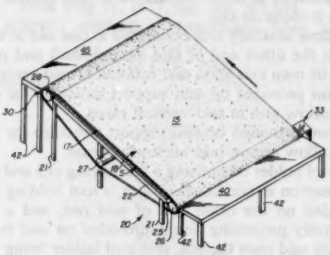
drive means fixed to said frame and arranged to apply a driving force to each of said driven rotary means associated with said moving bins during the time each bin is adjacent the sheet distributing station to effect a predetermined force on said incoming sheets.

4,087,088

MOVING ARTIFICIAL SKI SURFACE CONSTRUCTION

Kenneth J. Kelso, P.O. Box 37222, Houston, Tex. 77036

Filed Sep. 24, 1976, Ser. No. 726,167
Int. Cl.[2] A63G *21/14*
U.S. Cl. 272—56.5 SS **1 Claim**



1. In an artificial ski surface construction wherein the ski surface is supported at an angle to form a slope and wherein power means are provided to move the artificial ski surface along the slope, the invention including:

a. a continuous support surface;

b. an energy absorbing base of elastomer covering said continuous support surface and having an upper surface;

c. a flexible membrane extending continuously longitudinally and laterally over the upper surface of said elastomer base;

d. a movable, continuous surface including a fabric underside to contact said continuous membrane as the continuous surface is moved thereover, and said continuous surface having fibers extending upwardly from the fabric to provide an artificial ski surface; and

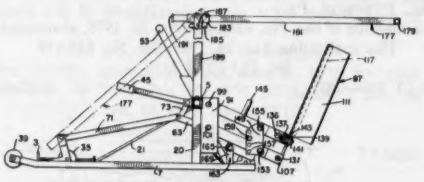
e. said energy absorbing elastomer base being of substantially greater thickness than the combined thickness of said flexible continuous membrane and movable continuous surface.

4,087,089

FOOTBALL LINEMAN TRAINER

Charles Phelps Forrest, 1306 St. Stephens Rd., Mobile, Ala. 36603

Filed May 18, 1976, Ser. No. 687,743
Int. Cl.[2] A63B *67/00*
U.S. Cl. 273—55 R **14 Claims**



7. A football lineman trainer comprising a frame mounted on a plurality of elongated ground engaging runners having flat surfaces slidable on the ground, a pad unit disposed vertically in front of each runner, each of said pad units including a substantially rectangular cushioned pad having a substantially flat large outer face adapted to be contacted by the face or shoulder of a lineman, and means attaching each of said pad units on the frame for bodily vertical movement thereof when contacted by a lineman about a pivotal axis transverse to the runner from a lower position to an upper position and from the upper position to the lower position and into and through a position intermediate the lower and upper positions, means

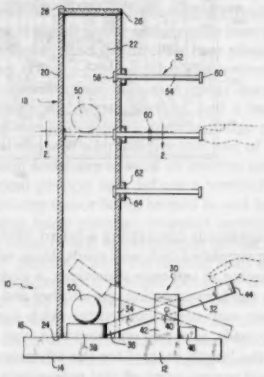
carried by the frame for controlling the degree of ground resistance of the runners, means carried by the frame for moving the pad units into and through said positions, and means operable by an operator positioned on the frame for independently actuating each of said foregoing means.

4,087,090

AMUSEMENT DEVICE WITH VERTICAL PROJECTILE LAUNCHING AND CATCHING MEANS

Burton D. Goldberg, 15109 Watergate Rd., Silver Spring, Md. 20904

Filed May 7, 1976, Ser. No. 684,231
Int. Cl.[2] A63F *7/02*; A63B *65/12*
U.S. Cl. 273—95 R **4 Claims**



1. An amusement device for launching and catching a projectile, comprising:

an axially elongated tubular member having an upstanding wall means which circumscribes and defines an internal chamber;

said wall means being formed of transparent material to permit visual observation of said chamber;

said tubular member having an upper end and a lower end;

a supporting base connected with said tubular member at its lower end;

a cover connected with said tubular member at its upper end;

a projectile freely disposed within said chamber;

launching means at least partially disposed within the lower end of said chamber to propel said projectile axially upward in said chamber, said projectile being adapted to descend by gravitational force to come to rest upon said launching means; and

projectile retaining means movably mounted in said wall means between the upper and lower ends of said tubular member;

said projectile retaining means including a plurality of retaining members which can be digitally inserted into said chamber after said projectile has been propelled upwardly above the height thereof to thereby catch and retain said projectile as it gravitationally descends in said chamber;

said wall means having a plurality of spaced openings formed therein at locations between said upper and lower ends;

one of said retaining members being disposed in each of said spaced openings and being movable between an extended position where said retaining member extends across said chamber to block passage of said projectile and a retracted position where said retaining member is substantially withdrawn from said chamber to permit free movement of said projectile;

each of said retaining members being movable independently of the other retaining members;

said retaining members being movable between their extended and retracted positions by means of digital manipulation from outside of said tubular member;

an inner end member connected to the end of each retaining member which fits within said chamber, said inner end member having a size in excess of the opening in which said retaining member is disposed to prevent said retaining member from becoming totally separated from said tubular member;

said inner end member engaging against one side of said wall means when said retaining means is moved to its extended position and engaging against the opposite side of said wall means when said retaining member is moved to its retracted position.

4,087,091

SPINNER APPARATUS FOR PLAYING THROW GAME

Raymond F. DeLorge, 20 Alden Ave., Enfield, Conn. 06082

Filed Jan. 24, 1977, Ser. No. 762,001
Int. Cl.[2] A63F *9/02*
U.S. Cl. 273—95 R **10 Claims**

1. A recreational apparatus comprising: a board, an open funnel shaped member, means for securing said funnel shaped member to said board, a spinner wheel having indicia disposed in a circle on a face thereof, means for rotatably securing said wheel to said board, said wheel being located in a position adjoining said funnel shaped member, a flapper assembly, means for securing said flapper assembly to said board in a position beneath the funnel shaped member and adjacent to said spinner wheel, a bean bag, means on said flapper assembly for contact by said bean bag, means in said flapper assembly for actuating the spinner wheel to rotate, whereby when said bean bag passes through the funnel shaped member and contacts said flapper assembly, it imparts forces on said flapper assembly causing said actuating means to rotate said spinner wheel, and indicating means on said board in contact with said spinner wheel for pointing to one fo the indicia on the spinner wheel when said wheel stops.

4,087,092

RANDOM GENERATOR INSTANT GAME AND METHOD

Stephen R. Krause, Baltimore, Md.; Max Goldman, Cherry Hill, N.J., and Emanuel Gnat, New York, N.Y., assignors to Tele Vend Inc., Baltimore, Md. and SOI, Princeton, N.J., part interest to each

Filed Oct. 7, 1976, Ser. No. 730,682
Int. Cl.[2] A63B *71/00*
U.S. Cl. 273—138 A **17 Claims**

1. An instant totally chance game method utilizing a ticket for receiving a multi-digit random number from a random number generator upon insertion into the game housing comprising the steps of:

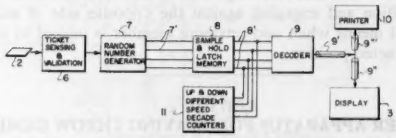
sensing the presence of the ticket;

deriving the random number from said random number generator in response to said sensing;

transferring the random number to memory means; and,

decoding the random number in the memory means for printing upon said ticket to determine any win from said multidigit random number.

5. Instant totally chance game apparatus of a type which utilizes a ticket for receiving a randomly generated printed number comprising in combination:



means for sensing the presence of the ticket when inserted into the apparatus by a player;

random number generator means adapted for continuous operation;

means responsive to the sensing means to stop thee random generator means;

memory means for receiving a number from the stopped random number generator means; and,

means for printing said number upon said ticket to determine any win using said multi-digit number.

4,087,093

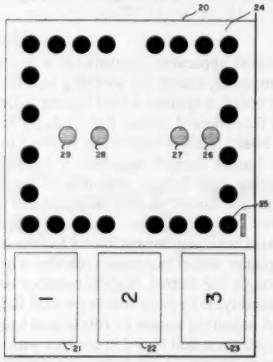
GAME APPARATUS WITH MULTIPLE BOARDS

Leon Alfred Imbert, 1937 Darrah St. No. 24, Ceres, Calif. 95307

Filed Aug. 25, 1976, Ser. No. 717,685

Int. Cl.[2] A63F *3/00*

U.S. Cl. 273—243 **2 Claims**



1. In a game apparatus comprising a central betting board having six marked betting spaces and three marked areas for the placement of three decks of standard playing cards, a plurality of identical, individual playing cards each having three marked spaces for discarding said standard playing cards, a predetermined number of marked movement spaces for a closed-end route of travel extending about said card for the purpose of continuous play, and four marked spaces for placement of a record keeping token for recording each time a moving token completes one full lap around said closed-end route of travel, playing tokens for movement about said route of travel, three decks of standard playing cards for placement on said marked areas on said central betting board, one die, marking tokens, betting chips and play money, wherein the number of spaces travelled by said playing tokens along said route of travel is determined by taking the difference between the value obtained by rolling the one die and the value shown on a card drawn from one of the decks of standard playing cards.

4,087,094

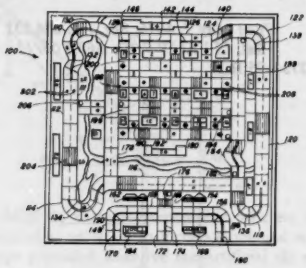
TRAFFIC BOARD GAME

Larry Bakay, 4 Ricker Rd., Kinnelon, N.J. 07405

Filed Feb. 28, 1977, Ser. No. 772,638

Int. Cl.[2] A63F *3/04*

U.S. Cl. 273—254 **8 Claims**



1. A game apparatus comprising a board having a plurality of intersecting simulated two way roads, lanes within said two way roads running in opposite directions, a plurality of simulated one way roads intersecting one another and said two way roads, said one way roads connecting with and intersecting said two way roads, said one way and two way roads having spaces along the length thereof for the advancement of game pieces over said spaces, some of said spaces being of a greater length than the remainder of said spaces so that when a game marker is moved from space to space, an illusion of relatively greater speed is created when said spaces of a greater length are traversed, base points marked on said board from which game play may be initiated or concluded by game pieces, destination points marked on said board to which game pieces may be moved during the course of game play, game pieces for movement along said spaces, game piece chance means for randomly selecting the number of said spaces through which a game piece may be moved, destination chance means for selecting destination points to which said game pieces may be moved.

4,087,095

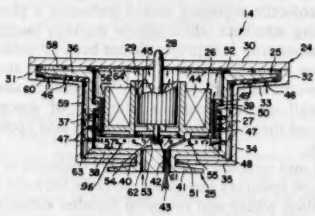
PNEUMATIC RECORD PLAYER

Masuo Koda, 1096-19 Imaizumi, Kamakura, Kanakawa, Japan (247)

Filed Dec. 2, 1976, Ser. No. 747,003

Int. Cl.[2] G11B *3/60, 3/10*

U.S. Cl. 274—9 R **13 Claims**



1. A record player device comprising: a platter member comprising a disc for supporting a record, a hollow platter member, and a base plate portion, said disc having a center spindle; a support means for providing support; a driving

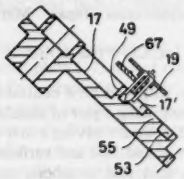
motor; and conduit means adapted for providing compressed air from a compressor; slanting said base plate portion having a center aperture formed therein; said hollow platter member being composed of two concentric cylindrical portions as an upper first cylindrical portion with a greater diameter than the other, and lower second cylindrical portion with a smaller diameter, the first cylindrical portion mounting the disc on an upper face thereof centrally of said disc; said second cylindrical portion being extended upwardly from the base plate portion; a horizontal annular portion having said two concentric cylindrical portion intermediated therewith; said support means comprising a supporting body member housed in said platter member, said support means including an annular flange portion positioned within said first cylindrical portion opposing said disc and said slanting annular portion, and defining an upper horizontal laminated annular air-channel and a lower horizontal laminated annular air-channel, a circular base plate portion positioned slightly over said circular base plate portion of the platter member, and the circular base plate potion having a supporting column portion which is vertically extended and projected outwardly through said center aperture of base plate terminating with a foot portion, and a barrel portion which intermediates said slanting annular flange portion of an inner peripheral end and a circumferential end of said circular base plate portion and faces toward an interior surface of said second cylindrical portion and defines a vertical annular air-channel; said driving motor being housed in said barrel portion of said supporting body member, oriented vertically as defining the interior room of said barrel portion into an upper chamber and a lower chamber, with the driving shaft of said motor being directly engaged with a center spindle of said disc of the platter member; and a vertical conduit means adapted for supplying compressed air and for receiving compressed air from a compressor and directing the same into said lower chamber, the vertical conduit means being inserted with said column and foot portion of the supporting body member; horizontal orifices formed on said barrel portion of a circumferential side in the range of said lower chamber for leading one part of said compressed air in said lower chamber into said vertical annular air-channel; vertical air-channel means for communicating said lower chamber with said upper chamber for passing another part of said compressed air in said lower chamber into said upper chamber, said upper horizontal laminated annular air-channel; and vertical discharge orifices formed on said slanting annular portion of said platter member in circumference discharging compressed air from said lower horizontal laminated annular air-channel into an ambient space.

4,087,096

PICK-UP ARM POSITIONING MECHANISM FOR AN AUTOMATIC RECORD PLAYER

Kurt Eisemann, Berlin, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 10, 1976, Ser. No. 685,067
Claims priority, application Germany, May 16, 1975, 2521870
Int. Cl.[2] G11B *17/08*
U.S. Cl. 274—10 R **3 Claims**



1. A pick-up arm control mechanism for an automatic record player in which pick-up arm movements during the changing cycle are controlled by a command disc in which grooves are formed for a sensor pin connected to the pick-up arm, one of a plurality of substantially concentric grooves being the pin guiding groove for a specific phonograph record size, and the pin being directed into the desired pin-guiding groove by mechanical means, the mechanism comprising

a sensor pin having a sleeve, and a bottom groove engaging portion tapered toward a bottom point and means for resiliently mounting at least said bottom groove engaging portion,

means for connecting the sensor pin to a pick-up arm to control lateral pivoting of the arm,

a command disc mounted for rotation about a disc axis, said disc having a surface generally perpendicular to said axis and having a plurality of grooves formed therein, including an eccentric diversion groove having a bottom groove portion having a trapezoidal cross-section with a perpendicular inner flank and an oblique outer flank inclined at an angle corresponding to the taper of the pin bottom point, extending outwardly from said axis along said surface in a given rotational direction, a plurality of generally concentric pin-guiding grooves each having an entrance adjoining the diversion groove,

means for rotating said disc in said given direction, said pin being mounted in said connecting means such that said pin engages said diversion groove as the disc rotates in said given direction during a changing cycle, said sleeve engages the perpendicular inner flank, and said bottom groove engaging portion resiliently engages said oblique outer portion of the bottom groove portion; whereby engagement of the pin with the diversion groove during said rotation urges said pin toward the axis of the disc,

a stop, and

means for selectively interposing said stop in a position adjacent the entrance of a selected pin-guiding groove so as to block further movement of the pin toward the axis,

whereby upon engagement of the pin with the stop while disc rotation is urging the pin toward the axis, the pin is forced out of resilient engagement with said diversion groove and engages said selected pin-guiding groove.

4,087,097

SEALING DEVICE FOR THE EMERGENT SHAFT END OF A ROTATING MACHINE

Jacky Bossens, Pont-Saint-Esprit, and Jean Louis Lacourieux, Bourg-les-Valence, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 8, 1977, Ser. No. 766,578
Claims priority, application France, Feb. 9, 1976, 76 03499
Int. Cl.[2] F16J *15/40*
U.S. Cl. 277—3 **4 Claims**

1. A sealing device for preventing leakage of a hazardous gaseous fluid from a casing containing said fluid, said casing comprising a housing for a pump or the like with a rotable shaft from said pump extending through an opening in the casing, the sealing device being located in said opening around the shaft;

said device comprising a chamber and a compartment arranged in sequence between the gaseous fluid in the casing and the atmosphere;

the chamber comprising a sleeve circumscribing the shaft with first and second means for sealing its ends against the shaft;

the compartment being formed by said second sealing means, an annular housing around the shaft and a floating ring contacting the periphery of said shaft;

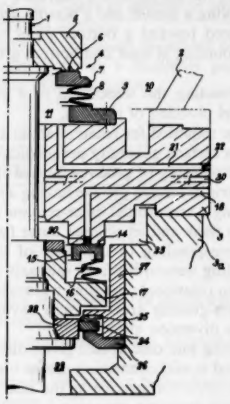
at least two ducts extending through the sleeve, the first duct being in fluid communication with the interior of said chamber for conducting gases away from said chamber, the second duct being for conducting a barrier gas toward said chamber and terminating at its inner end at a sealing face on said sleeve;

the second sealing means being biased toward sealing contact with said sealing face, the second sealing means

and sealing face being structured to allow the simultaneous flow of the barrier gas from the second duct into the chamber and the compartment;

the pressure and volume of barrier gas flow into the compartment being great enough to maintain a pressure drop across the floating ring between the compartment and the atmosphre; and

means for regulating a substantially constant pressure differential between the interior of the chamber and the casing.



4,087,098

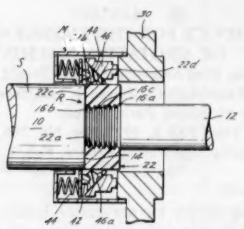
SEAL FOR REPAIR OF A SHAFT OR THE LIKE AND A METHOD FOR DOING SAME

David W. Alley, 5917 Harbrook, Houston, Tex. 77017

Filed May 19, 1977, Ser. No. 798,448

Int. Cl.² F16J *15/34*

U.S. Cl. 277—9 **12 Claims**



1. A seal device particularly adapted for sealing between a shaft and a mechanical seal, wherein the shaft has two longitudinal portions of different outside diameters positioned longitudinally in sequence, with only one end of each portion adjacent to only one end of the other, comprising:

a shaft having:

a large diameter longitudinal portion and a small diameter longitudinal portion positioned longitudinally in sequence;

a radial shoulder formed adjacent said large diameter longitudinal portion of said shaft and extending radially inwardly; and,

a longitudinal taper formed between said radial shoulder and said small diameter longitudinal portion of said shaft; and,

seal means for sealing said shaft with the mechanical seal having:

an outer sealing surface adapted to contact the mechanical seal;

an inner sealing surface in engagement with said longitudinal taper; and,

a radial sealing surface for engagement with said radial shoulder.

4,087,099

OIL SEAL MEANS FOR ROTARY PISTON ENGINES

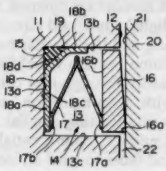
Noriyuki Kurio, Higashihiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Japan

Filed Feb. 25, 1977, Ser. No. 772,132

Claims priority, application Japan, Mar. 1, 1976, 51-22425; Mar. 25, 1976, 51-33374; Apr. 9, 1976, 51-44915[U]

Int. Cl.² F16J *15/34*

U.S. Cl. 277—81 R **9 Claims**



1. In a rotary piston engine comprising a casing having a pair of opposed inner side surfaces, and a rotor disposed in the casing and having opposite side surfaces confronting with said inner side surfaces of the casing, oil seal means adapted to be positioned in annular seal grooves defined in each of said side surfaces of the rotor including a bottom and a pair of side walls, the improvement wherein said oil seal means comprises:

seal ring means having lip means adapted to be brought into sliding engagement with the inner side surfaces of the casing,

bellows-shaped annular spring means having one end secured to the seal ring means,

annular member means of L-shaped cross-section secured to the other end of the spring means and having bottom and peripheral wall portions seated along the bottom wall and one of the side walls of the seal groove, respectively,

said peripheral wall portion being positioned behind said seal ring means so that said seal ring means can be brought into abutting engagement with said peripheral wall portion when said annular spring means is collapsed beyond a predetermined distance, and

auxiliary seal means disposed in said seal groove between said annular member means and a wall of said annular seal groove.

4,087,100

SEAL ASSEMBLY

Akira Yoshihashi, and Takeshi Kato, both of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Mar. 29, 1976, Ser. No. 671,722

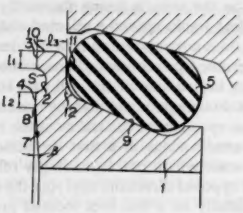
Claims priority, application Japan, Mar. 27, 1975, 50-40163[U]

Int. Cl.² F16J *15/38*

U.S. Cl. 277—92 **1 Claim**

1. A seal assembly, disposed on a central longitudinal axis, said seal assembly comprising a pair of annular rigid seal members, each of said seal members having a first seal surface at the top end portion thereof said first seal surfaces mating to form a first seal between said seal members, an annular groove positioned inside of the first seal surface said annular grooves mating to form an annular groove means for accumulating particles which pass through said first seal and, a second seal surface positioned inside of the annular groove said second seal surfaces mating to form a second seal between said seal members, wherein the facing surfaces of said seal members under

the second seal surfaces are slightly tapered; and a pair of elastomeric retaining members disposed on said seal members for urging said pair of seal members to come into contact with each other to form said first and second seals with said annular



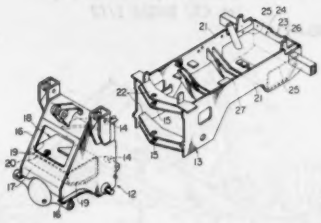
groove means therebetween; and wherein widths of the first and second seal surfaces are about 1.0 to about 3.0mm and about 0.5 to about 3.0mm respectively, and wherein the cross-sectional area of said annular groove is more than 0.2mm^2.

4,087,101

INDUSTRIAL VEHICLE FRAME WITH INTERNAL, STRUCTURALLY REINFORCING FUEL AND HYDRAULIC FLUID TANKS

Akio Shimazaki, and Osamu Kambe, both of Osaka, Japan, assignors to Toyo Umpanki Co., Ltd., Osaka, Japan

Filed Oct. 27, 1976, Ser. No. 736,016
Claims priority, application Japan, Jan. 12, 1976, 51-2375[U]
Int. Cl.^{2} B62D *25/00*
U.S. Cl. 280—5 A **4 Claims**



1. In an industrial vehicle including a front frame (12) and a rear frame (13) adapted to be pivotally joined by a vertical shaft extending through bearing members (14, 15), the improvements characterized by:

(a) the front and rear frames having generally U-shaped sections,

(b) the front frame comprising a pair of opposed side plates (16) and a front plate (17) joined thereto,

(c) a substantially rectangular parallelopiped fuel tank (24) internally mounted in the rear frame, extending thereacross, and securely fastened thereto, and

(d) a substantially rectangular parallelopiped hydraulic fluid tank (18) internally mounted in the front frame, and extending thereacross,

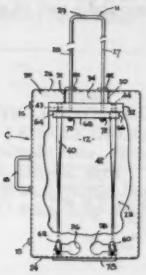
(e) the side edges (19) and the upper front edge (20) of the hydraulic fluid tank being rigidly secured to the side plates and the front plate, respectively, whereby said tanks structurally reinforce and increase the rigidity of their respective frames.

4,087,102

HAND CARRYABLE TRAVEL CONTAINER CONVERTABLE TO ROLLABLE CART

Stephen B. Sprague, 1135 W. Hamilton Ave., Campbell, Calif. 95008

Filed Dec. 8, 1976, Ser. No. 748,490
Int. Cl.^{2} B62B *3/02*
U.S. Cl. 280—37 **6 Claims**



3. A pallet assembly adapted to support in juxtaposition with one face thereof, an object such as a container for holding travelling effects, and having adjacent an opposite face anti-friction elements which are selectively projectable and retractable, whereby such object may be moved about with the aid of said elements when in projected position and alternately slid upon said opposite face when the elements are retracted, said assembly comprising in combination:

an elongated, generally planar pallet having obverse and reverse faces, the reverse face having associated means for supportive attachment to a weight-bearing object such as a travel container,

anti-friction elements comprising a pair of laterally separated rollers pivotally carried by the pallet and jointly movable between a functional position of outward projection from the obverse face and a non-functional position of retraction therefrom,

and operating means for projecting and retracting both of said rollers in unison, said means comprising a pair of elongated, parallel-faced, rigid ribbons, each shaped with its length progressively helically twisted approximately a quarter turn, each ribbon carrying one of said rollers adjacent an end of the twisted length and each ribbon secured lengthwise to said pallet by longitudinally aligned bearing means adjacent each end of its twisted length, which lengths are laterally spaced apart and disposed generally parallel to each other and thus adapted by partial rotation on a longitudinal axis to effect projection and retraction of the carried rollers, and

shift means for effecting projection and retraction of said rollers including a transverse yoke each end being bifurcate having a pair of ribbon-embracing surfaces each pair disposed in sliding registration with a twisted length of a different one of said ribbons and adapted by its movement lengthwise along said pair of twisted ribbons to rotate the latter in unison and thereby project and retract the rollers carried by such ribbons.

4,087,103

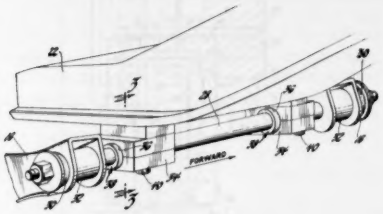
INDEPENDENT SUSPENSION SYSTEM

Gary L. Smith, Pontiac, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 29, 1976, Ser. No. 745,832
Int. Cl.^{2} B62D *7/06*; F16F *1/38*
U.S. Cl. 280—96.1 **7 Claims**

1. In combination with a vehicle frame, an independently sprung front wheel assembly comprising a wishbone-shaped control arm having an outer end and a pair of spaced apart inner ends; a steering knuckle and associated road wheel

mounted on the outer end of said control arm; a vertically oriented coil spring disposed between said control arm and said frame; a horizontally oriented shaft; means connecting said spaced apart inner ends of said control arm to the ends of said shaft for pivotal movement about said shaft; front and rear clamp members having bores formed therethrough a predetermined diameter larger than the diameter of said shaft and surrounding said shaft intermediate said inner ends; fastener means for rigidly securing each of said front and rear clamp members to said frame; and a pair of spaced apart eccentric



elastomeric bushings mounted on said shaft and confined in the respective bores of said front and rear clamp members, said eccentric elastomeric bushings having thicker top and bottom thicknesses providing a small vertical deflection of said shaft relative to said clamp members, and thinner side thicknesses, with the side facing said road wheel being reduced in thickness by a vertically oriented arcuate cut-out providing a large horizontal deflection of said shaft relative to said clamp members during road impact conditions, thereby substantially isolating said frame from such impacts.

4,087,104

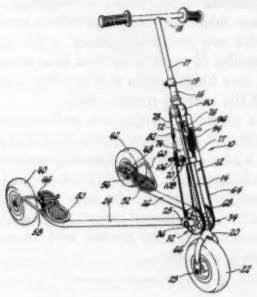
METHOD OF MANUALLY PROPELLING A CAMBERING VEHICLE

Frank J. Winchell, Orchard Lake, and Klaus O. Winkelmann, Troy, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 649,967, Jan. 19, 1976, which is a continuation-in-part of Ser. No. 578,839, May 19, 1975, abandoned. This application Aug. 16, 1976, Ser. No. 714,901

Int. Cl.[2] B62K *5/00*; B62M *1/00*

U.S. Cl. 280—210 **4 Claims**



1. A method of manually propelling a cambering vehicle having a longitudinally extending roll axis and a manually steerable front contact means operatively mounted on a main frame and engaging a support surface and further having a pair of laterally spaced trailing arms interconnected by an equalizer mechanism and pivoted to the main frame of the vehicle for up and down swinging movement each with a rear contact means pivoted for turning movement about an axis extending laterally at a fixed angle with respect to an associated one of said arms and each said contact engaging the support surface and each of said arms having foot rest means adjacent the end thereof so the operator may stand in a natural upright position with his feet laterally spaced apart on the trailing arms and manually steer the front contact means comprising the following operator steps: imparting an initial velocity to the vehicle, physically standing erect on the vehicle facing forwardly with the rear contacts providing tracks spaced a selected distance apart and with each foot on a corresponding foot rest means, manually steering the steerable front contact means, cambering the vehicle and contacts to one side of the roll axis and steering the vehicle in a first arcuate path and thereby concurrently widening operator foot spacing and the tracks of the rear contacts as a first of said arms swings in a first direction relative to a second of said arms which correspondingly relatively swings in a second and opposite direction, applying the majority of the body weight initially on a first foot located proximate to the outside of the first arcuate path while initially cambering the vehicle, progressively and gradually shifting body weight from the first foot to the second foot located proximate to the inside of the first arcuate path while the first arcuate path is being executed to effect an increase in vehicle velocity, completing the first arcuate path with the vehicle reaching an upright stance and with the spacing of the rear contacts approximating said selected distance, cambering the vehicle and contacts to the other side of the roll axis and camber steering the vehicle in a second arcuate path having a reverse curvature as compared to said first arcuate path, thereby concurrently widening operator foot spacing and tracks of the rear contacts as the first of said arms relatively swings in the second direction and the second of said arms relatively swings in the first direction, and progressively and gradually shifting the body weight from the second foot to the first foot while the second arcuate path is being executed to further effect an increase in vehicle velocity in a net forward direction of travel.

4,087,105

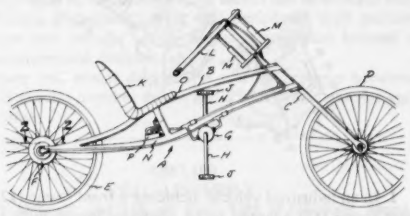
HYDRAULIC POWERED BICYCLE

John G. Amarantos, 6114 Gardenia Ave., Long Beach, Calif. 90805

Filed May 12, 1977, Ser. No. 796,488

Int. Cl.[2] B62M *1/12*

U.S. Cl. 280—216 **3 Claims**



1. A bicycle of the type that includes an elongate frame having a forward and rearward end, a fork pivotally supported from said forward end, a forward wheel rotatably supported by said fork, a seat supported on said frame for a user, and said bicycle being characterized by:

a. a rear wheel assembly that has a hydraulic motor for a hub, with said hydraulic motor supported from said rearward end of said frame;

b. a first hydraulic fluid pump supported from said frame;

c. first means for manually driving said first pump by the action of the feet of said user;

d. handle bars pivotally supported for up and down reciprocal movement from said fork;

e. a second hydraulic pump that is driven by reciprocal up and down movement of said handle bars;

f. a hydraulic fluid reservoir supported from said frame;

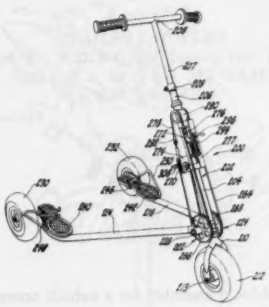
g. a hydraulic fluid accumulator supported from said frame;
h. a multi-position, multi-port first valve supported from said frame;
i. a first movable lever for manually moving said first valve to a desired one of a plurality of positions;
j. conduit and check valve means so connecting said ports of said first valve, said first and second pumps, said hydraulic motor, said reservoir, and said accumulator that when said first valve is in a first position hydraulic fluid is supplied to said first and second pumps to be pressurized by the actuation of said pumps and delivered to said motor to drive the latter and said rear wheel to propel said bicycle, with said fluid after flowing through said motor returning to said reservoir with said conduit means when said valve is in a second position and said bicycle coasting downhill allowing said motor to temporarily act as a pump to discharge hydraulic fluid from said reservoir to said accumulator to be pressurized by compressing an air cushion maintained in the latter, and said conduit means when said bicycle is on the level and said first valve is in a third position allowing pressurized hydraulic fluid in said accumulator to flow from the latter to said motor to actuate the latter;
k. a second normally open valve in said conduit means that is so disposed that as it is moved towards a closed position the back pressure on hydraulic fluid in said motor is increased to brake the rotation of said rear wheel; and
l. a second manually operated lever for manually moving said second valve from said open towards said closed position.

4,087,106

CAMBERING VEHICLE

Frank J. Winchell, Orchard Lake, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 578,739, May 19, 1975, abandoned. This application Jan. 19, 1976, Ser. No. 649,967
Int. Cl.[2] B62K *5/00*
U.S. Cl. 280—220 **15 Claims**



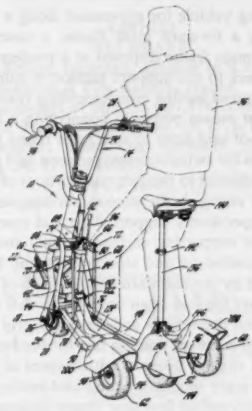
1. A three-wheel cambering vehicle comprising a frame having a forward portion and a pair of elongated trailing arms which extend rearwardly from said forward portion of said frame and which terminate in end portions, pivot means pivotally connecting front end portions of said trailing arms to said forward portion of said frame to support said arms for up and down swinging movement, a bell crank pivoted to said forward portion of said frame in spaced relation to said pivot means and extending in a direction generally transverse with respect to said trailing arms, linkage means connecting each of said trailing arms to said bell crank, said frame having an upwardly extending steering shaft rotatably and steerably mounted to said forward portion of said frame, a front wheel rotatably mounted at the lower end of said steering shaft, manual steering means having a grip portion and connected to the upper end of said steering shaft, and a rear wheel for each of said trailing arms rotatably mounted at the rear end portions thereof, said pivot means for said trailing arms being located forwardly of the grip portion of said manual steering means, said end portions of said trailing arms having foot rest means thereon wide enough to receive the feet of an operator and support the operator in a natural upright standing position to enable said operator to manually grasp the grip portion of said manual steering means and camber the vehicle by leaning to one side thereof to cause one of said trailing arms to move in one direction and the other of said arms to move in an opposite direction to thereby effect equal camber of said rear wheels.

4,087,107

CAMBERING VEHICLE WITH TRAILING ARM SEAT FOR VEHICLE OPERATOR

Frank J. Winchell, Orchard Lake, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 16, 1976, Ser. No. 714,902
Int. Cl.[2] B62K *5/00*; B62M *1/00*
U.S. Cl. 280—220 **4 Claims**

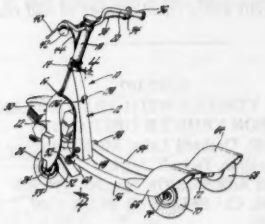


1. A cambering vehicle comprising an upright main frame, rotatable and steerable front wheel means, support means pivotally mounting said front wheel means to said main frame, manual steering means operatively connected to said support means to permit said support means and said front wheel means to be manually turned by a vehicle operator to steer said vehicle along a selected course, left and right side trailing arms extending from said main frame, pivot means pivotally connecting the forward end of said left trailing arm on the left side of said main frame and the forward end of said right trailing arm on the right side of said main frame so that said arms swing upwardly and downwardly in separate left and right planes, left and right ground contact wheels supported at the free ends of said left and right trailing arms, left and right foot rest means supported by said left and right arms adjacent the free ends thereof to receive the feet of a vehicle operator so that the vehicle operator can stand upright on the vehicle and shift body weight from one foot to the other while manually gripping said steering means and steering said vehicle along a selected path, a third trailing arm interposed between the left and right trailing arms, attaching means connecting a forward end portion of said third trailing arm to said main frame, ground contact wheel means rotatably supported on the free end of said third trailing arm, a support independent of said frame extending from the free end of said third trailing arm, seat means secured to said support to carry the vehicle operator in a sitting position while the operator rides and operates said vehicle in an upright or cambering mode of operation.

4,087,108
CAMBERING VEHICLE WITH TRAILING ARMS INTERCONNECTED BY SPUR GEARING

Frank J. Winchell, Orchard Lake, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 28, 1976, Ser. No. 727,588
Int. Cl.[2] B62M *1/00*
U.S. Cl. 280—221 4 Claims



1. A cambering vehicle for movement along a support surface comprising a forward main frame, a steering column secured to said main frame disposed at a predetermined rake angle with respect to the support surface, a pair of laterally spaced and elongated trailing arms extending rearwardly from said frame, pivot means pivotally connecting a forward end portion of each of said arms to said main frame thereby supporting said arms for swinging movement on said pivot means, contact means adjacent to the free end portions of each of said trailing arms for engaging the support surface, steerable front contact means operatively supported on said steering column for engaging the supporting surface, manual steering means operatively connected to said steering column, foot support means supported by the rearward ends of each of said trailing arms for receiving the feet of an operator so that the operator can stand erect on the vehicle and manually grip said manual steering means, gear means holding said forward main frame in a predetermined angular position with respect to said support surface and drivingly interconnecting said trailing arms, said gear means incorporating first gear means secured directly to said pivot means for one of said arms and second gear means meshing directly with said first gear means and secured directly to said pivot means for the other of said arms to thereby provide a geared drive connection between said trailing arms so that they swing in equal and opposite directions allowing said vehicle and contact means to be cambered by a standing operator riding said vehicle with all of said contact means remaining in contact with said support surface.

4,087,109
MOTORCYCLE FRAME AND SUSPENSION AND METHODS OF MAKING AND USING THE SAME

William F. Davis, 6234 Langdon Ct., Berkeley, Mo. 63134

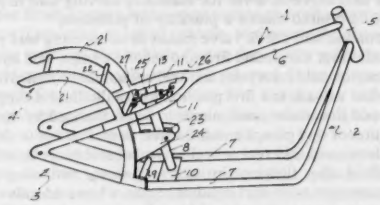
Continuation-in-part of Ser. No. 666,669, Mar. 15, 1976, Pat. No. 4,022,484. This application Feb. 22, 1977, Ser. No. 770,648
Int. Cl.[2] B62K *25/10*
U.S. Cl. 280—284 1 Claim

1. A motorcycle frame comprising,

a main frame, comprising a first vertical member, a plurality of longitudinal members attached to and extending rearwardly from said first vertical member, a second vertical member operably coupling said longitudinal members and a plurality of contoured rear vertical members disposed between said longitudinal members,

a rear frame, comprising a plurality of longitudinal members coupled at one end thereof and a plurality of contoured vertical members disposed between said longitudinal members, said rear frame pivotally mounted to said main frame, and

transitional structure means operably mounted on said main frame, and

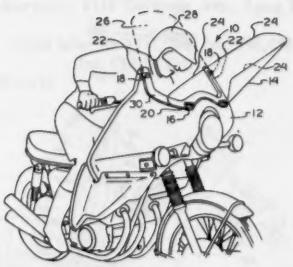


damping means operably connecting said main frame to said rear frame.

4,087,110
WINDSHIELD ASSEMBLY

Craig W. Vetter, Rantoul, Ill., assignor to Vetter Design Works, Inc., San Luis Obispo, Calif.

Continuation-in-part of Ser. No. 639,998, Dec. 12, 1975, abandoned. This application Feb. 17, 1977, Ser. No. 769,579
Int. Cl.[2] B62J *17/00*
U.S. Cl. 280—289 S 13 Claims



1. The windshield assembly for a vehicle comprising:

a windshield;

means for securing one portion of the windshield to the vehicle accommodating movement of another portion of the windshield relative to the vehicle in a forward direction of vehicle travel;

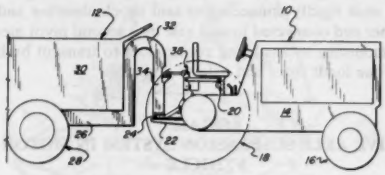
means secured to the vehicle and spaced from said securing means for releasably holding the windshield in an upright position, said releasable holding means includes a member mounted to the vehicle and overlying the windshield adjacent an edge thereof to restrain the windshield against forward movement, said windshield separating from said overlying means upon receiving an impact force of selected magnitude in said forward direction; and

a portion of the impact force is transmitted through the windshield to the overlying member, and the overlying member is sufficiently flexible to bend away from the windshield in response to the impact force to release the hold thereon.

4,087,111
LOAD TRANSFER APPARATUS FOR USE BETWEEN A TRACTOR HITCHED TO A TRAILER

Willard R. Williams, Naturita, Colo., assignor to Williams, Inc., Naturita, Colo.

Filed Apr. 30, 1976, Ser. No. 681,833
Int. Cl.[2] B60D 1/06
U.S. Cl. 280—406 R 3 Claims



1. Load transfer apparatus for use with a tractor and a trailer comprising:

a trailer having a gooseneck frame with an upper curved portion and terminating at a free end in a vertical portion;

hitch connection means positioned at the free end of the gooseneck frame;

a tractor having a drawbar;

hitch means mounted on the tractor drawbar connected with the hitch connection means of the trailer;

a linkage member connected at one extremity to the tractor and at the other extremity to the vertical portion of the trailer frame above and in vertically spaced relation to the drawbar hitch connection; and,

means operatively connecting said one extremity of the linkage member to the tractor for effectively foreshortening the distance between points of connection of said linkage to said tractor and said trailer to effect a pulling force on the trailer and tractor.

4,087,112
TRAILER COUPLER

Lindell E. Lee, Jr., P.O. Box 402, Idalou, Tex. 79329

Filed Feb. 4, 1977, Ser. No. 765,617
Int. Cl.[2] B60D 1/02
U.S. Cl. 280—515 6 Claims

1. In a trailer coupler having

a. a draft pin member having

(i) a longitudinal axis,

(ii) a pivot end, and

(iii) a distal end, and

b. a C-shaped retaining handle member having

(i) a pivot end, and

(ii) a distal end,

c. a fastener connecting the pivot end of said retaining handle member to the pivot end of said draft pin member,

d. said fastener providing means for rotating said retaining handle member about an axis at its pivot end perpendicular to the longitudinal axis of said draft pin member;

THE IMPROVED STRUCTURE COMPRISING IN COMBINATION WITH THE ABOVE:

e. one of said members having a cam at its pivot end,

f. said cam having two flat faces,

g. the other of said members having a cam follower at its pivot end,

h. said cam follower contacting said cam, and

j. resilient means operatively interconnecting said other member and said cam follower for biasing said cam follower toward said cam,

k. so that when one flat face of the cam is on said cam follower, the distal end of the members are proximate, and

m. when the other flat face of the cam is on said cam follower, the distal end of the retaining handle member is remote from said draft pin member,

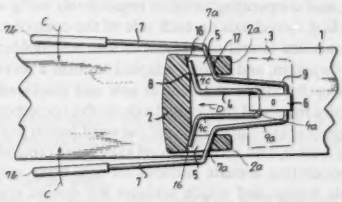
n. said cam follower is a washer coaxially around the draft pin member near the pivot end, and

o. said resilient means is a helical compression spring around said draft pin member between a collar thereon and said washer.

4,087,113
SKI BRAKE

Tilo Riedel, Eching, Germany, assignor to S.A. Etablissements Francois Salomon & Fils, Annecy, France

Continuation-in-part of Ser. No. 557,476, Mar. 12, 1975, Pat. No. 3,989,271. This application Jun. 18, 1976, Ser. No. 697,614
Claims priority, application Germany, Mar. 15, 1974, 2412623; Jul. 26, 1974, 2435155
Int. Cl.[2] A63C 7/10
U.S. Cl. 280—605 4 Claims



1. A brake for a ski automatically operable to prevent free flight thereof upon the release of the ski from a ski boot, said brake comprising:

support means on the upper surface of said ski formed with a passage for mounting the brake thereon;

a spring-wire actuator having a bent portion received in said passage and swingable on said support means, said actuator being formed with a brake element and a bight, said bight being displaceable from a position lying along said surface into a position upstanding therefrom, said brake element extending transversely to the ski in the upstanding position of said actuator downwardly into the snow;

a tread plate swingably mounted on said bight portion and displaceable by said ski boot to press said actuator toward said surface; and

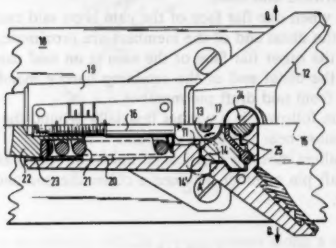
a further element connecting said plate to said support means and serving to guide said plate along a predetermined path, while forming a force-storing means tending to swing said actuator into its upstanding position, said further element including a spring wire swingable in another passage on said support means and having a bight pivotally connected to said plate, said support means between said passages forming one side, said tread plate forming an opposite side, said further element forming a third side and said actuator forming a fourth side of a quadrilateral stretching said bight of said actuator away from said support means when said tread plate is pressed toward said surface.

4,087,114

TOE IRON

Gabor Csösz, Leonberg-Gebersheim, Germany, assignor to Vereinigte Baubeschlagfabriken Gretsch & Co. GmbH, Leonberg, Germany

Filed Dec. 9, 1976, Ser. No. 748,735
Claims priority, application Germany, Dec. 23, 1975, 2558339
Int. Cl. A63c *9/08*
U.S. Cl. 280—625 **5 Claims**



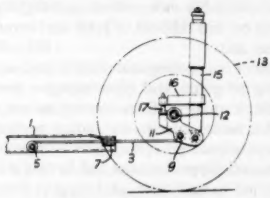
1. A safety toe clamp for a ski binding having a ski boot sole holder pivotally mounted for lateral movement and comprising a body member provided with adjustable spring means urging said sole holder in a forward direction into contact with said body member, said body member being provided with a pair of surfaces each oppositely disposed outside of said spring means and the central axis of said body member and each cooperating with corresponding surfaces provided on said sole holder, said cooperating surfaces respectively being adapted to form a first swivel axis on each side of the control axis during initial outward lateral movement of said sole holder in either lateral direction, and further adapted to form a second swivel axis on each side of the central axis and displaced laterally outwardly from said first swivel axis on the corresponding side of the central axis during further outward lateral movement of the sole holder, said second swivel axes being created by mutually cooperating arcuate surfaces on said body member and said sole holder and which surfaces are spaced apart during said initial outward lateral movement and engaged during said further outward lateral movement.

4,087,115

MOTOR VEHICLE REAR WHEEL SUSPENSION

Anthony Nigel Clifford Earle, Shenfield, England, assignor to Ford Motor Company, Dearborn, Mich.

Continuation-in-part of Ser. No. 615,646, Aug. 22, 1975, abandoned. This application Aug. 20, 1976, Ser. No. 716,490
Claims priority, application United Kingdom, Nov. 7, 1974, 48167/74
Int. Cl.² B60G *11/10*
U.S. Cl. 280—720 **8 Claims**



1. A suspension system for a motor vehicle having a vehicle body;

a transverse axle rotatably supporting left and right road wheels;

suspension means connected to said axle and connected to said body;

said suspension means including a telescopic shock absorber strut and mounting means connecting said shock absorber strut to said axle;

said mounting means comprising a first pivot means operatively interposed between said axle and said strut;

said mounting means further comprising a link having one of its ends rigidly connected to said shock absorber and its other end connected to said axle by a second pivot means;

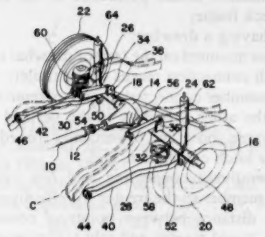
said mounting means being constructed to transmit braking torque loads from said axle to said strut.

4,087,116

DRIVE AXLE SUSPENSION SYSTEM IN MOTOR VEHICLE

Yoshio Morimoto, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Japan

Filed Aug. 5, 1976, Ser. No. 712,069
Claims priority, application Japan, Aug. 15, 1975, 50-99673
Int. Cl.² B60G *11/14*
U.S. Cl. 280—724 **3 Claims**



1. A drive axle suspension system for a motor vehicle, said system comprising a rigid drive axle, a housing for the rigid drive axle, an upper pair of generally longitudinally extending links pivotally connected at front ends thereof to a vehicle body and at rear ends thereof to opposed end portions of said housing, and a lower pair of generally longitudinally extending links pivotally connected at front ends thereof to the vehicle body and at rear ends thereof to opposed end portions of the housing at positions generally angularly spaced from the positions where said rear ends of said upper links are pivotally connected to the first mentioned opposed end portions of said housing, respectively, each of said links being positioned to define an angle with the horizontal datum, the angle of one link in at least one of said pairs of links being differentiated from the angle of the other link of said pair.

4,087,117

MOTOR VEHICLE REAR SUSPENSION SYSTEM

John F. G. Brace, Billericay; Joseph L. Dreissiger, Benfleet, and Anthony N. C. Earle, Shenfield, all of England, assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 13, 1976, Ser. No. 714,059
Int. Cl.² B60G *11/36*
U.S. Cl. 280—724 **2 Claims**

1. A rear suspension system for a motor vehicle having a vehicle body;

an axle rotatably supporting left and right road wheels;

suspension means interconnecting said vehicle body and said axle;

said suspension means including left and right longitudinally extending suspension arms;

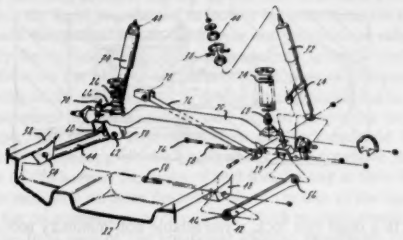
pivot means povitally connecting said arms to said vehicle body and to said axle;

left and right coil springs constructed to resiliently support a portion of the mass of said vehicle body on said axle;

left and right generally vertically arranged telescopic shock absorber struts;

left and right first resilient pivot means connecting said left and right shock absorber struts, respectively, to said axle;

left and right second resilient pivot means spaced apart from said first resilient pivot means connecting said left and right shock absorber struts, respectively, to said axle;



means constructed to limit laterial displacement of said body relative to said axle;

a Panhard rod arranged generally transversely of said vehicle body and having one end pivotally connected to said vehicle body and its other end pivotally connected to said axle.

4,087,118

SAFETY SEAT BELT SYSTEM

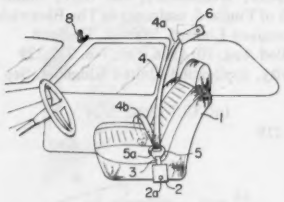
Toshiaki Shimogawa, Nishio; Kameo Uchiyamada, Okazaki, and Masayuki Morita, Tokoname, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Aug. 9, 1976, Ser. No. 712,873

Claims priority, application Japan, Aug. 29, 1975, 50-105246

Int. Cl.² B60R *21/10*

U.S. Cl. 280—745 **3 Claims**



1. A safety seat belt system for a seat in the passenger compartment of an automotive vehicle comprising:

(a) a belt having one end securely anchored to a door of a vehicle at a portion adjacent to the free swinging side edge of said door and the other end securely fixed to a first retractor, said first retractor being mounted in said compartment at an upper portion thereof on the side of said door;

(b) a through tongue through which is slidably inserted said belt, said through tongue having a hook engaging member;

(c) an inner belt having one end securely fixed to said through tongue and the other end securely fixed to a second retractor anchored to a lower inboard portion of said compartment;

(d) a hook member securely anchored to an upper portion of a pillar in said compartment forwardly of said first retractor such that, when said through tongue is suspended from said hook member on said hook engaging member, the visibility of an occupant of the seat is substantially obstructed by said inner belt.

4,087,119

FLUID PRESSURE OPERATED DUCT COUPLING

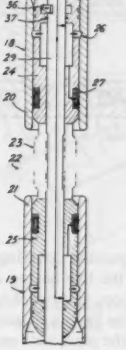
Andre Capdebosc, Jurancon, and Michel Moinard, Bizanos, both of France, assignors to Societe Nationale Elf Aquitaine (Production), Paris, France

Filed Jun. 18, 1976, Ser. No. 697,450

Claims priority, application France, Jun. 30, 1975, 75 20515

Int. Cl.² F16L *35/00*

U.S. Cl. 285—18 **15 Claims**



1. A connecting device for providing a flexible fluid tight connection between the ends of two articulatable duct sections comprising:

a flexible tubular joint;

a cylindrical connecting unit having an axial passage therethrough secured to each end of said joint, each of said connecting units adapted to be inserted into an end portion of a duct section, each of said connecting units including;

a fluid operable piston mounted for translation in an annular chamber formed in said connecting unit, said piston having a conical exterior surface portion and translatable along said axis between a first position and a second position;

movable studs mounted in a bore formed in said connecting unit transverse to said axis and having an end in contact with said surface portion; said studs movable in response to translation of said piston from a retracted position when said piston is in a first position to an anchoring position when said piston is in its second position in which the other end of said studs project outwardly of said connecting unit to engage an anchoring channel formed in said duct section;

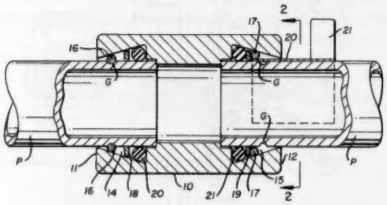
a variable volume chamber defined between an end of said piston and said chamber to receive fluid under pressure from a fluid pressure source to cause translation of said piston along said axis from said first position to said second position and thereby cause said studs to anchor said connecting unit to said duct section; and

a fluid inflatable seal disposed in a channel formed in the exterior surface of said connecting unit and which is in selective communication with said fluid pressure source to thereby inflate said seal to provide a fluid type seal between said connecting unit and said duct section.

4,087,120
PIPE COUPLING WITH A WEDGING CONTRACTILE RING

Edgar B. Rumble, Girard, Ohio, assignor to Michigan Pipe Fittings Company, Div. of Michigan Hanger Co. Inc., Hubbard, Ohio

Continuation-in-part of Ser. No. 696,508, Jun. 16, 1976, abandoned. This application Feb. 10, 1977, Ser. No. 767,456
Int. Cl.[2] F16L *35/00*
U.S. Cl. 285—39 5 Claims

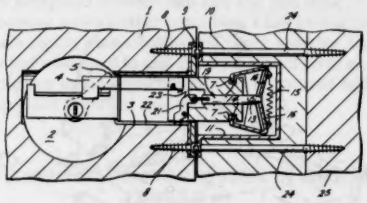


1. A readily separable coupling for joining partially telescoped pipes and the like having circumferential grooves on their exterior surfaces, said coupling having a longitudinal axis and a central portion having an inner diameter greater than the inner diameter of the pipes but less than the outer diameter of the pipes, a pair of first grooves defined in the inner surface of said coupling adjacent said central portion and having an inner diameter greater than the inner diameter of said central portion to define shoulders on said central portion, the inner ends of said pipes abutting said shoulders when the pipes are fully received in said coupling, with a portion of the pipe ends extending inwardly of said central portion to be pressurized by fluid in said coupling said coupling having a circumferentially tapered channel in its inner surface inwardly of each of its ends, each of said channels having a tapered side wall arranged so that the smallest diameter of the tapered channel is adjacent the end of the coupling and a back wall which is integral with said coupling and immovable with respect thereto and is essentially perpendicular to said coupling longitudinal axis, said tapered side walls being located to be spaced apart from the exterior surfaces of the pipes to define first gaps adjacent said coupling ends and second gaps adjacent said back walls, a first pair of cross sectionally round, contractible split rings of a inner diameter fitting within the circumferential grooves of the pipes and a thickness greater in size than said first gaps but smaller in size than said second gaps, said first pair of split rings being jammed against said tapered side walls by movement of the pipes outwardly of said coupling caused by fluid pressure in said coupling exerting force on the pipe inner ends, said jamming of said first pair of split rings against said tapered side wall securely locking the pipes into said coupling, and a second pair of cross sectionally rectangular split rings of a diameter fitting within the circumferentially tapered channels in abutting relation to said pipes and being sized to abut an adjacent tapered wall when mounted on said pipes to additionally secure said pipes in said coupling, sealing means in said tapered channels engaging said pipes and said coupling in sealing relation to prevent fluid from reaching said first pair of split rings, and means for moving the first pair of split rings substantially out of said circumferential grooves and into said circumferentially tapered channels and holding said second pair of split rings away from said smallest diameters of said circumferentially tapered channels to release the pipes from said coupling.

4,087,121
DEAD BOLT LOCK

Thomas R. Davis, 5115 Shady Oak La., Friendswood, Tex. 77546

Filed Mar. 14, 1977, Ser. No. 777,550
Int. Cl.[2] E05B *15/02*
U.S. Cl. 292—139 2 Claims

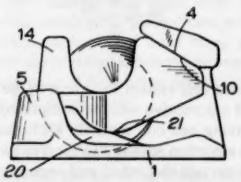


1. In a dead bolt lock, a retractable bolt manually movable into and out of extended position, an axial shaft extending longitudinally through said retractable bolt and movable therewith, locking means movable into engagement with said retractable bolt, means for manually moving said shaft outwardly from said retractable bolt after said retractable bolt reaches its extended position, and into contact with said locking means and into engagement therewith, said retractable bolt comprising a movable member connected at one end to an actuating means, and having notches formed in the exterior surface adjacent the other end, a barrel in which said bolt reciprocates, said barrel having a longitudinal slot therein, a link pivotally mounted in said barrel having one end extended into said slot, and the other end loosely connected to said axial shaft and positioned to be moved against the end of said axial shaft and move said shaft outwardly from said bolt.

4,087,122
FASTENING MECHANISM FOR DOORS

Leslie Ralph Shaw, Wednesbury, and Barry Stanley Morris, Walsall, both of England, assignors to The Bloxwich Lock and Stamping Company Limited, Walsall, England

Filed Aug. 10, 1976, Ser. No. 713,229
Claims priority, application United Kingdom, Sep. 12, 1975, 37529/75
Int. Cl.[2] E05C *3/04*
U.S. Cl. 292—218 1 Claim



1. Fastening mechanism for doors of vehicles and freight containers in which an operating bar mounted in bearings on a door for angular movement about its axis carries on at least one end a fastening member incorporating fastening elements extending from opposite sides of the bar for engagement with cooperating parts of two spaced projections extending forwardly from a keeper having a base or mounting plate adapted to be mounted on the top or bottom of the door frame to which the door is hinged along one vertical edge, wherein the mechanism comprises a keeper having a base for attachment to a door frame, a first integral forward projection on the base comprising a shank portion and a laterally extending head of which the surfaces facing the base are substantially flat and inclined at an acute angle to the base, a second integral forward projection

on the base spaced from the first projection and incorporating a forwardly facing recess, a groove in the base extending from said second projection towards said first projection, and transversely spaced raised portions of the base on opposite sides of said groove intermediate said first and second projections, and a fastening member for cooperation with said keeper and angularly movable about an axis parallel to the plane of the door, said fastening member having on one side of its axis a fork of which the limbs are adapted to receive between them the shank of said first projection on the keeper and terminate in substantially flat inclined surfaces for engagement with the inclined surfaces on the head of said first projection on the keeper and having on the other side of its axis a radially projecting lug for engagement in the recess in said second projection on the keeper, and further having between said fork and said lug a radially projecting rib for engagement in said groove in the base of the keeper, the limbs of said fork having at their inner ends radiussed surfaces described about the axis of the operating bar on opposite sides of said rib, which surfaces cooperate, in the final part of the rotational locking movement of the fastening member, with said raised portions of the base of the keeper which act as fulcrums forcing the flat ends of the fork limbs into locking engagement with the flat inclined surfaces of the head of the first projection on the keeper in the fully fastened condition of the mechanism.

4,087,123

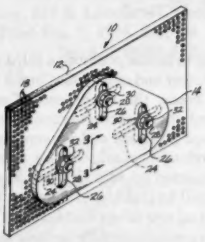
BI-DIRECTIONAL ADJUSTABLE COUPLINGS

Charles Gordon Redshaw, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Division of Ser. No. 662,982, Mar. 1, 1976, Pat. No. 4,035,093. This application Dec. 20, 1976, Ser. No. 752,482

Int. Cl.[2] E05C *21/00*

U.S. Cl. 292—341.19 **4 Claims**



1. A door latch mechanism comprising: a first member of a coupling, said first member having a multiplicity of inwardly tapered projections located in bi-directional alignment at 90°, a second member having a multiplicity of recesses shaped and located to receive the projections from the first member to permit the two members when separated to be moved bi-directionally and to be locked when joined together, a door latch and door latch track one of which is mounted to the second member, and means for adjustably locking the two members together to effect an adjustment between the latch and the latch track.

4,087,124

ILLUMINATED DRAG REDUCING SYSTEM

Nathaniel C. Wiley, Jr., Weston, Conn., assignor to Rudkin-Wiley Corporation, Stratford, Conn.

Continuation of Ser. No. 490,249, Jul. 22, 1974, abandoned. This application Feb. 6, 1976, Ser. No. 655,874

Int. Cl.[2] B62D *35/00*

U.S. Cl. 296—1 S **16 Claims**

1. A combined unitary, integrated drag reducing and illuminated information system for mounting to land transport vehicles, said vehicles having an upstanding substantially vertical drag producing surface, comprising in combination:

(A) a drag reducing member for mounting on the vehicle and incorporating

(a) a drag reducing surface

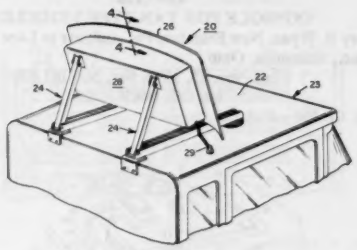
(1) forming the frontal area of the drag reducing member,

(2) extending transversely to the direction of motion of the vehicle,

(3) spaced forward of said drag producing surface, and

(4) generally sloping rearwardly from the mounting surface toward the upstanding drag producing surface for reducing the air drag of the vehicle when the vehicle is moving through a fluid,

(b) a housing extending rearwardly from the drag reducing surface, and



(c) a portal zone formed in the drag reducing surface and providing access to the housing through the frontal drag reducing surface;

(B) a source of illumination mounted in said housing of said drag reducing member,

(C) a light transmitting panel

(a) dimensioned to fill the area defined by the portal zone, and

(b) mounted to said drag reducing surface for completely closing and substantially sealing said portal zone, and

(D) information indicia mounted to said light transmitting panel for illumination thereof by said source of illumination,

whereby the combined, unitary, integrated system provides, simultaneously, continuous air drag reduction as the vehicle moves through a fluid and complete illumination of the information indicia for clear visibility.

4,087,125

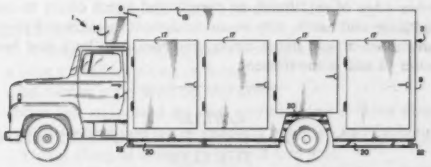
CARGO VEHICLE

C. W. Stephens, 51 Osage Ave., Kansas City, Kans. 66105

Filed Oct. 27, 1976, Ser. No. 736,125

Int. Cl.[2] B62D *39/00*

U.S. Cl. 296—24 B **10 Claims**



1. A cargo vehicle comprising:

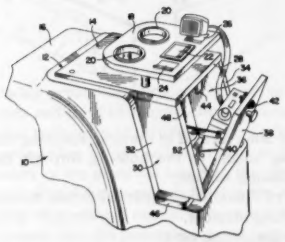
(a) an elongated cargo body having opposite side walls, a floor, opposite end walls, and a roof;

(b) means on one of said body end walls for directing cooling air into said cargo body;

(c) a first partition and a second partition each extending upwardly from said floor and extending transversely be-

tween said side walls to define opposite end compartments and a center compartment within said cargo body;
(d) door means in each of the side walls of said cargo body for access to respective compartments within said body;
(e) means in each of said end compartments defining a respective upwardly opening passage therein for longitudinal flow of cooling air;
(f) means extending between said first partition and said second partition defining a duct having opposite end portions thereof extending through said respective partitions and communicating with said respective passages in the end compartments;
(g) a plurality of ports in lower portions of the means defining said upwardly opening passage for flow of cooling air into respective compartments.

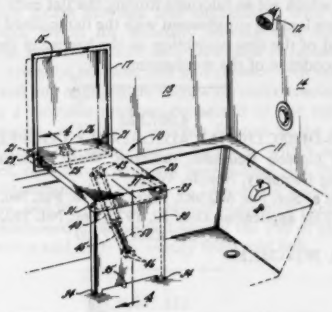
4,087,126
CONSOLE FOR VAN-TYPE VEHICLES
Larry R. Wynn, New Brighton, Pa., assignor to Luce Industries, Inc., Ashtabula, Ohio
Filed Nov. 15, 1976, Ser. No. 741,678
Int. Cl.[2] B60R 7/04
U.S. Cl. 296—37.8 **1 Claim**



1. In an automobile van with an engine shroud extending rearwardly into the interior of said van, said shroud having a substantially horizontal upper surface and an inclined substantially vertical rear surface, a security and convenience console comprising: a first platform having a base portion adapted to rest on top of the upper surface of said shroud and a cantilever portion projecting rearwardly from said base portion; means to rigidly secure said base portion to said upper surface of said shroud; a second platform spaced above and secured parallel to said first platform by a plurality of support posts positioned substantially vertically between said first and second platforms and integrally secured therebetween; convenience receptacles in said second platform including at least one liquid container holder and at least one article container tray; a security compartment adapted to abut against said rear surface of said shroud and rigidly fastened to the under surface of said cantilever portion of said first platform and extending downwardly therefrom; hatch means to provide access into said compartment; a hatch cover pivotally secured at its lower edge to the lower edge of said hatch to permit said hatch cover to open and close said hatch; stop means to delimit the outward pivotal movement of said hatch cover; and means to lock said hatch cover to said compartment.

4,087,127
SEATING UNIT FOR A BATH TUB, SHOWER STALL OR THE LIKE
Russell P. Lotta, 1632 Regina La., Rockford, Ill. 61102
Filed Apr. 25, 1977, Ser. No. 790,401
Int. Cl.[2] A47C 1/126
U.S. Cl. 297—14 **1 Claim**

1. A foldable seating unit for use in a bath tub, a shower stall or the like, said unit comprising a generally rectangular box having an open side, said box being adapted to fit in an opening in a wall with the open side of the box facing outwardly and disposed substantially flush with the wall, a seat having approximately the same height and width as said box and pivotally connected to the lower end portion of said box to swing downwardly from a vertical storage position to a horizontal use position, said seat being disposed within said box when in said storage position and projecting outwardly from said box when in said use position, a leg having approximately the same height and width as said box and pivotally connected to the free end of said seat to swing from a storage position to a use position, said leg lying along the outer side of said seat and closing the outer side of said box when said seat and said leg are in their storage positions and projecting downwardly from the outer end of said seat supporting the latter when said seat and said legs are in said use positions, first and second braces, a first pivot pivotally connecting one end of said first brace to the underside of said seat, said first brace extending downwardly and outwardly from said first pivot when said seat is in its use position, a second pivot pivotally connecting one end of said second brace to the inner side of said leg, said second brace extending upwardly and inwardly from said second

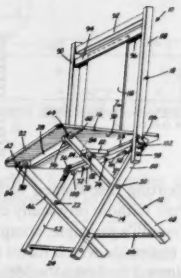


pivot when said leg is in its use position, a third pivot pivotally interconnecting the lower end of said first brace with the upper end of said second brace, the lower end of said first brace abutting the upper end of said second brace when said seat and said leg are in their use positions and preventing said leg from swinging inwardly relative to said seat, a contractile spring having one end connected to said first brace and having an opposite end connected to said leg, said spring urging said leg inwardly relative to said seat when said seat and leg are in their use positions and wrapping partially around said third pivot and urging said leg inwardly when said leg is in its storage position, horizontally spaced feet on the lower end of said leg, said feet frictionally engaging the lower side of said box when said leg is in its storage position and serving to hold said leg releasably in said box, the space between said feet defining a hand hole enabling the lower end of said leg to be grabbed for the purpose of moving said leg between its storage and use positions, a boss projecting upwardly from the lower side of said box, and a resiliently flexible lip on the inner end of said seat and engaging said boss when said seat is in said storage position so as to hold said seat in such position.

4,087,128
FOLDING CHAIR
Clayton L. Shepard, 824 S. Main St., Bluffton, Ind. 46714
Filed Aug. 10, 1977, Ser. No. 823,430
Int. Cl.[2] A47C 4/14
U.S. Cl. 297—52 **7 Claims**

1. In a folding chair of the type having a planar seat panel, open and generally rectangular inner and outer leg frames pivotally connected together and nestable one within the other, said seat panel being pivotally connected to one of said leg frames near one end of said seat panel, means for connecting the other of said leg frames to said seat panel near the other

end of said seat panel, a seat back including a generally rectangular and open frame pivotally secured to one of said leg frames and nestable with said inner and outer frames, and means for supporting said seat back in a fully extended, generally upright position with respect to said seat panel, said seat back frame being rotatable forwardly toward said seat panel from said fully extended position, the improvement comprising: a rigid back panel, said seat back frame having a slot



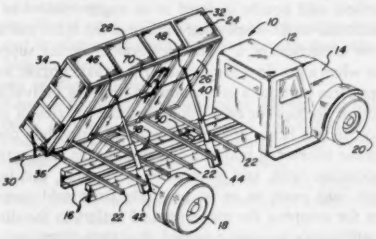
therein extending generally parallel to one edge of said back panel for selectively capturing said seat back panel, and means for pivotally connecting said back panel to said seat panel such that when said seat back frame is in said fully extended position, said back panel is captured by and received in said slot and held in a position generally coplanar with said seat back frame, but when said seat back frame is rotated forwardly to a given position, said back panel will clear said slot and said seat back frame such that it is free to rotate relative thereto.

4,087,129

CARGO GATE OPERATORS

Loren R. Maxey, 615 S. Loomis, Ft. Collins, Colo. 80521

Filed Sep. 7, 1976, Ser. No. 721,162
Int. Cl.² B60P 1/22
U.S. Cl. 298—18 **10 Claims**



1. In a vehicle system having a vertically tilting cargo box with at least one normally upright gate hinged along its lower margin so as to be swingable outwardly, an operator for said gate comprising:

a cable track sector mounted on said cargo box at one end of said gate to rotate about a common axis with said gate, one end of said sector being coupled to said gate at a point above said lower margin;

a motive drive system mounted on the bottom side of said cargo box for movement therewith;

a cable coupled at one end to said track sector and at the other end to said drive system;

and means for routing said cable along said cargo box between said track sector and said drive system, operation of said drive system working said track sector by means of said cable to effect opening and closing swinging of said gate;

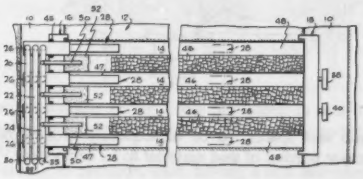
said motive drive system being operative to work said track sector in any adjusted position of said cargo box.

4,087,130

PROCESS FOR THE GASIFICATION OF COAL IN SITU

Donald E. Garrett, Claremont, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Continuation of Ser. No. 628,063, Nov. 3, 1975, abandoned, which is a continuation of Ser. No. 456,203, Mar. 29, 1974, abandoned. This application Apr. 14, 1977, Ser. No. 787,710
Int. Cl.² C10J 5/00
U.S. Cl. 299—2 **35 Claims**



1. A process for the in situ gasification of coal which comprises injecting a gaseous source of oxygen into a coal formation adjacent one end of said coal formation, and burning a portion of said coal to raise its temperature sufficiently to support the water gas reaction, removing flue gas from said coal formation adjacent said one end thereof during said burning of said coal and injecting steam into said heated portion of said coal formation adjacent said one end of said formation, to convert said heated coal to a water gas product, removing said product gas at another end of said coal formation, thereby minimizing mixing of flue gas and product gas, said injection of said gaseous source of oxygen and said injection of steam being carried out in a cyclic manner, and continuing said combustion and gasification by said cyclic introducing of said gaseous source of oxygen and said steam into adjacent heated progressive portions of said coal formation.

4,087,131

DRAG BIT EXCAVATION

Carl R. Peterson, Boxford, and Allan T. Fisk, Salem, both of Mass., assignors to Rapidex, Inc., Burlington, Mass.

Filed Nov. 1, 1976, Ser. No. 737,061
Int. Cl.² E21C 27/22, 29/24
U.S. Cl. 299—18 **36 Claims**

1. A drag bit excavating device comprising

a core extending along an axis,

a bit carrier supported on said core,

cutter bits supported by said carrier along a three dimensional spiral having a constant pitch P and increasing radius along at least a portion of said axis,

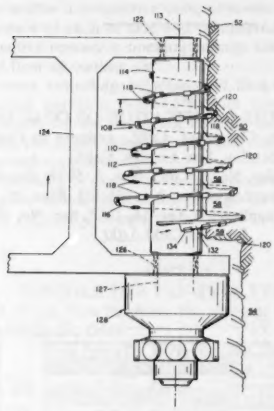
said carrier being relieved to provide radially extending spaces between the turns of said spiral,

a frame supporting said core, carrier, and bits for rotation about and advance along said axis,

a drive to provide said rotation and said advance at the rate of one pitch P per revolution, and

means including said bits for cutting in the material to be

excavated a slot of depth that increases with said advance, while leaving between portions of said slot and extending



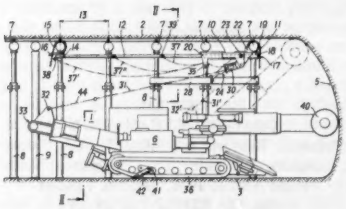
into said spaces, to be subsequently broken away, the major portion of said material to be excavated.

4,087,132

DEVICE FOR GUYING A MOVABLE CUTTING MACHINE

Friedrich Ressler, Fohnsdorf, Austria, assignor to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed Oct. 18, 1976, Ser. No. 733,405
Claims priority, application Austria, Oct. 29, 1975, 8239/75
Int. Cl.[2] E21C *29/02, 29/04*
U.S. Cl. 299—33 **15 Claims**



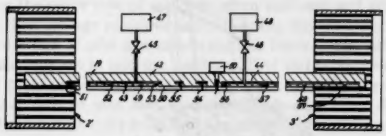
1. Apparatus for guying a movable cutting machine provided with a caterpillar drive in its operating position and for moving the cutting machine in an ascending gallery having a floor, roof and sidewalls, said gallery being consolidated by means of supporting frames formed of caps and props or posts, said machine including a longitudinal frame supporting a cutting head at its forward end; said apparatus including at least one connecting member fastened to said frame near the rear end thereof; at least one tension member in the form of a chain or cable connected to said connecting member and extending forwardly, said tension member being connected via a winch to at least one further connecting member which is arranged on the cap of at least one of the supporting frames and which is releasably connected to said cap.

4,087,133

TRANSPORT SYSTEM FOR DISC-SHAPED WORK-PIECES

Oluf Per Olofsen; Kaj Sonnik Lund, both of Roskilde, and Bent Karlo Jorgensen, Stenlose, all of Denmark, assignors to Chemical Reactor Equipment A/S, Roskilde, Denmark

Filed Nov. 19, 1975, Ser. No. 633,197
Claims priority, application Denmark, Nov. 20, 1974, 6040/74
Int. Cl.[2] B65G *51/02*
U.S. Cl. 302—2 R **3 Claims**



1. A system for transporting disc-shaped wafers for use in semiconductor manufacture without physically contacting said wafers, by the use of Bernouilli's principle, comprising two rail sections, each having an underside which forms a substantially flat suspension surface limited by lateral guide means for the movement of said wafers, a longitudinal duct formed inside each rail section, a gas source connected with said duct having a number of inclined gas ejection nozzles extending between said duct and said suspension surface, the orifices of said nozzles being positioned substantially along the longitudinal symmetry line of said suspension surface and the axes of said nozzles having an orientation in said direction of transportation, one rail section being formed in one end for introduction to a prescribed depth into an open-front supply magazine for unloading wafers from individual tracks therein, and the other rail section being formed in one end for introduction to a prescribed depth into a receiving magazine for loading wafers thereinto, supporting means having an upwardly facing supporting surface arranged in a co-operative relationship with a spacing to the end of said rail sections remote from said one end to receive a wafer transported by said one rail section from said supply magazine, said other rail section having at least one nozzle positioned in an overlying relationship to said supporting surface, said nozzle inclined at an angle relative to a line perpendicular to the suspension surface of the other rail section to allow attraction of a wafer positioned on the supporting surface when a gas flow is ejected through said nozzle, said rail sections form parts of a continuous rail having individual sets of ejection nozzles for each such part, the nozzles of each of said nozzle sets being connected with an individual common duct in the interior of said rail, and stop means being provided in association with said supporting surface at the junction between said parts so as to protrude from said suspension surface for stopping the movement of wafers in the direction from said supply magazine to said receiving magazine.

4,087,134

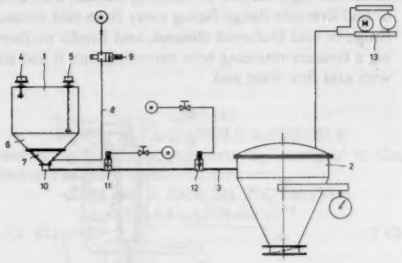
METHOD AND APPARATUS FOR THE PNEUMATIC CONVEYING OF MILK POWDER

Walter Jordan, Osterburken, and Willi Konrath, Kassel-Wolfsanger, both of Germany, assignors to AZO-Maschinenfabrik Adolf Zimmermann, Germany

Filed Oct. 5, 1976, Ser. No. 729,711
Int. Cl.[2] B65G *53/24*
U.S. Cl. 302—53 **5 Claims**

1. A method for the pneumatic batch conveying of powders in which the batches are formed and conveyed along a path in a suction flow and the suction flow is interrupted at a point

between a feed zone and a receiving zone without the placing of obstructions in said path at intervals corresponding to the



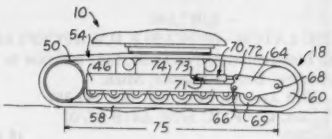
batch size while leaving batches downstream of said point under the influence of said suction flow.

4,087,135

EXCAVATOR IDLER-OUTRIGGER

Dale H. Unruh, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sep. 17, 1976, Ser. No. 724,205
Int. Cl.[2] B62D *55/14*
U.S. Cl. 305—22 **4 Claims**



1. A track assembly for a track-supported vehicle,
a body having an undercarriage extending downwardly therefrom,
a pair of driven sprockets carried by one end portion of said undercarriage,
a plurality of track rollers on each side of said undercarriage and in alignment with the sprocket on that side of said undercarriage.
a pair of idler wheels,
link means for supporting said idler wheels, said link means being pivotally mounted on said undercarriage and extending outwardly therefrom and said idler wheels being rotatably mounted on said link means,
a pair of endless tracks, each one of which forms a circuit about one of said sprockets, one set of track rollers and one of said idler wheels, and
means attached to said undercarriage and to said link means for moving at least one of said link means between a first raised position at which the tension on the track associated with said link means is decreased relative to a preselected value and a second lowered position at which the tension on said track is increased relative to said preselected value.

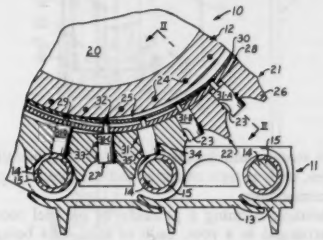
4,087,136

TRACK-TYPE VEHICLE WHEEL HAVING CONTROLLED IMPACT RESISTANCE

Roger L. Boggs, East Peoria, Ill., and John W. Sogge, Cedar Rapids, Iowa, assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 9, 1976, Ser. No. 712,566
Int. Cl.[2] B62D *55/12*
U.S. Cl. 305—57 **8 Claims**

1. A wheel of a track-type vehicle, comprising:
a hub;
a rim having an outer surface and a plurality of generally radially extending openings and being connected to the hub;
an annular chamber defined by said rim and said hub, said openings of the rim opening into said chamber;
a first annular spring assembly having a plurality of generally radially extending openings generally coaxial with said rim openings, said first annular spring being positioned in said chamber adjacent the rim;



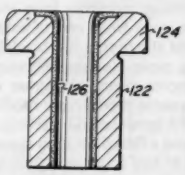
a second annular spring being positioned in said chamber and forcibly urging against the first annular spring assembly; and
a plurality of plungers, each having a first end portion extending through an associated opening of the first annular spring assembly and a second end portion extending through an associated opening of the rim, said plungers being movable into and from the wheel chamber and controllably biased outwardly by the second spring.

4,087,137

DRILL BUSHING AND SIMILAR ARTICLE

Edward J. Voitas, Mahwah, N.J., assignor to Eastern Fusecoat Incorporated, Mahwah, N.J.

Filed Aug. 8, 1975, Ser. No. 603,242
Int. Cl.[2] F16C *33/04*
U.S. Cl. 308—237 R **21 Claims**



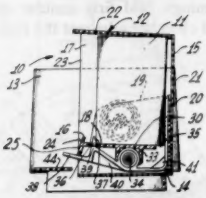
1. An article of manufacture for accurately confining a cylindrical element rotating about its longitudinal axis comprising:
a body formed of a relatively rigid material such as steel and having a longitudinal opening therein;
a liner of particles having a hardness of 84 – 93 Rockwell C in a matrix of material having a hardness of 59 – 67 Rockwell C bonded to at least a portion of the longitudinal opening in the body and having an opening therein to receive the cylindrical element and to permit said cylindrical element to rotate freely therein;
the liner being such that the liner and the body together have a coefficient of thermal expansion substantially equal to that of the cylindrical element to thereby accurately maintain the position of the cylindrical element as it rotates and confine it to rotation about its longitudinal axis.

4,087,138

DISPENSING CABINET

William P. McRae, 22 Lincoln Ct., Buena Park, Calif. 90620

Filed Apr. 6, 1977, Ser. No. 785,200
Int. Cl.² A47B *81/06*
U.S. Cl. 312—15 **20 Claims**



1. A storage and dispensing cabinet for generally rectangular articles, such as tape cassettes and the like, of a predetermined size comprising:

a housing forming a plurality of parallel rectangular slots arranged in a row, each of said slots being shaped and dimensioned to slidably receive a tape cassette of said predetermined size and having two parallel sidewalls, a top wall, a back wall, a floor, an ejector opening between said floor and said back wall, and an open front end through which said cassettes can be inserted and withdrawn;

a stand;

swivel means for supporting said housing on said stand and permitting rotation of said housing between a closed position in which said open ends of said slots are substantially horizontal and an open position in which said open ends of said slots are substantially vertical; and

a plurality of cassette ejector means, each associated with one of said slots for normally retaining a cassette in said slot and for ejecting said cassette from said slot when actuated;

each of said ejector means being an integrally formed, one-piece, molded plastic, flexible member including a rocker having a front end and a back end, attachment means for pivotally attaching said rocker to said housing beneath said floor, a free standing ejecting arm projecting from said back end of said rocker through said ejector opening to engage said cassette from behind, an actuator portion attached to said front end of said rocker and accessible from the exterior of said housing, an upstanding retaining portion projecting upwardly from said front end of said rocker at the open front end of said slot to retain said cassette in said slot, and a flat bendable portion between said attaching means and said ejecting arm;

each of said ejector means having an unflexed position in which said cassette is positively received within said corresponding slot between said ejecting arm and said retaining portion, and a flexed position assumed in response to a force applied to said actuator in which said ejecting arm is pivoted away from said back wall while remaining substantially unflexed to push said cassette at least partially through said open front end of said retraining portion to a position below said floor to permit said cassette to move through said open front end.

4,087,139

GUIDE FOR FASTENER

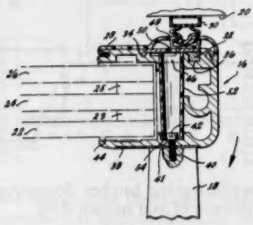
James J. Heaney, Glendale, Calif., assignor to Anthony's Manufacturing Company, Inc., San Fernando, Calif.

Filed May 17, 1976, Ser. No. 687,046
Int. Cl.² B25G *3/00*
U.S. Cl. 312—138 R **7 Claims**

1. An assembly for use in the door of a refrigerated cabinet, comprising:

a substantially U-shaped channel member having two spaced opposed side flanges for use as the structural portion of the door frame, said channel member having a first hole in a first side flange, and having a second hole in a second side flange aligned with said first hole;

a handle having a surface normally in contact with a surface of said first side flange facing away from said second side flange of said U-shaped channel, said handle surface having a fastener-retaining hole extending into it and aligned with said first hole; and



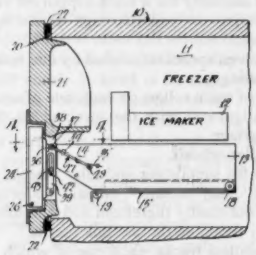
a tube abutting said first and said second side flanges and extending from and surrounding said first hole and fixed in position about said first hole in alignment with said second hole, to and surrounding said second hole, providing a guideway for directing a fastener separate from said tube toward said first hole.

4,087,140

MAGNETIC LATCH - MOVABLE ICE RECEPTACLE

William John Linstromberg, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Apr. 14, 1977, Ser. No. 787,357
Int. Cl.² F27C *5/18*; A47B *97/00*
U.S. Cl. 312—292 **15 Claims**



1. A cabinet apparatus, comprising:

means forming a storage compartment having an access opening;

a main closure member movable about a main axis for exposing and closing said opening, said main closure member having a secondary access opening therein to said compartment; a secondary closure member mounted on said main closure member and movable about a second axis for exposing and closing said secondary opening;

a receptacle in said compartment;

means mounting said receptacle for movement outwardly relative to said compartment thereby projecting partially from said compartment through said access openings when either of said openings is exposed; and

interconnecting means interconnecting said receptacle and said secondary closure member for effecting movement of said receptacle when either of said access doors are opened, said interconnecting means effectively breaking the connection of said receptacle to said secondary closure member after a relatively shorter movement of said

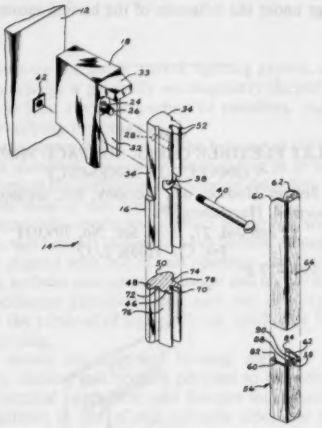
receptacle on movement of said main closure member about said main closure member axis.

4,087,141

DOOR PULL HANDLE ASSEMBLY

Edward H. Roberts, Jeffersontown, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Sep. 3, 1976, Ser. No. 720,130
Int. Cl.[2] A47B *95/02*
U.S. Cl. 312—320 7 Claims



1. A handle assembly comprising:
an elongated bar having a longitudinal groove formed in its front face and a longitudinal groove formed in each side;
an elongated flexible cover member for fastening over said bar, said cover member being of generally U-shaped cross section with a bight portion and opposite leg portions;
a longitudinal rib on the inner side of each cover leg portion for engagement with the longitudinal side grooves;
said cover member and bar being sized to provide a clearance between at least a portion of the space between each cover inner side and the sides of said bar; and
a longitudinal rib on the inner surface of the cover bight portion for engagement with the longitudinal front groove.

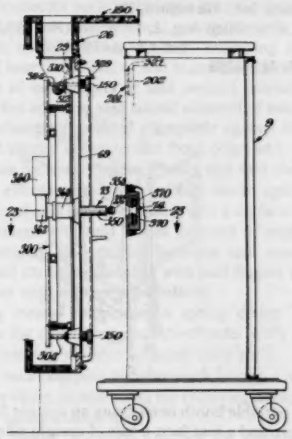
4,087,142

COUPLING MEANS FOR FOOD PREPARATION APPARATUS

Douglass D. Aumack, Los Gatos, Calif., assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Mar. 9, 1977, Ser. No. 775,768
Int. Cl.[2] F25B *29/00*; F25D *19/00*
U.S. Cl. 312—236 2 Claims

1. Apparatus for coupling a first and second cabinet including a female socket in the back panel of the first cabinet, a linear actuator assembly extending through the front panel of the second cabinet, said linear actuator assembly including an extendable, retractable and rotatable male crank, drive means for extending, retracting and rotating said crank, said socket including mating means, said crank including means for engaging said mating means upon extension and rotation of said



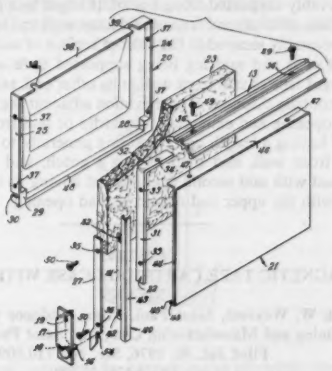
crank whereby said cabinets may be drawn toward each other upon retraction of said crank.

4,087,143

ICE MAKER CABINET DOOR CONSTRUCTION

Walter C. Barnard, White Bear Lake, Minn., and Kenneth J. Dahlstrom, St. Croix Falls, Wis., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Feb. 6, 1976, Ser. No. 655,704
Int. Cl.[2] E06B *3/00*
U.S. Cl. 312—138 R 19 Claims



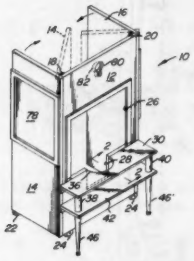
1. A door construction comprising:
a door panel having turned edge portions;
an L-shaped inner reinforcing member having one leg juxtaposed to an inner surface of one of said edge portions and having a second leg juxtaposed to an inner surface of an adjacent edge portion;
an outer door mounting rail juxtaposed to an outer surface of said one of said edge portions;
a handle for manipulating the door juxtaposed to said adjacent edge portion; and
securing means securing the mounting rail and handle to said reinforcing member with said one edge portion retained between said mounting rail and said reinforcing member and said adjacent edge portion retained between said handle and said reinforcing member whereby said handle is effectively structurally mounted to said rail.

4,087,144

PORTABLE BOOTH

Miriam P. Wax, Narberth, Pa., assignor to Consumer Idea Centers, Inc., Haverford, Pa.

Filed Aug. 2, 1976, Ser. No. 710,779
Int. Cl.[2] A47B *43/00*
U.S. Cl. 312—258 **4 Claims**



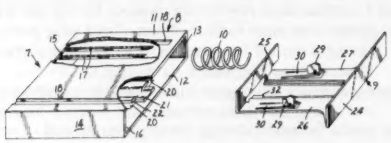
1. A portable booth comprising an upright front wall having a forward and a rear face, a pair of upright side walls, each side wall having at least one wheel on the lower end thereof, each side wall being pivotably connected to an edge portion of said front wall on the same side thereof and being generally perpendicular to the front wall and extending rearwardly thereof in an open position so as to thereby define a three-side structure, the transverse dimension of the side walls being approximately one-half the transverse dimension of the front wall, said side walls being pivotable between their open position generally perpendicular to the front wall and a collapsed position generally flush with said rear face of said front wall, said front wall having a first opening therein, a second opening having a width less than the first opening, said second opening extending downwardly from said first opening, and at least one shelf removably supported along one of its edges by a ledge extending from said forward face of said front wall and by at least one leg pivotably secured to the bottom surface of said shelf at one of its ends and said leg being supported by a means on the forward face of said front wall at its other end, said shelf being horizontally disposed at an elevation adjacent the lower end of said opening and extending forwardly of said front wall, said shell having a length corresponding generally to the width of said front wall, said shelf having a notch, said notch being aligned with said second opening and having its ends contiguous with the upper end of said second opening.

4,087,145

MAGNETIC TAPE CARTRIDGE CASE WITH BIASING MEANS

Mark W. Weavers, Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Jul. 30, 1976, Ser. No. 710,009
Int. Cl.[2] A47B *88/00*
U.S. Cl. 312—319 **3 Claims**



1. A case adapted for receiving a magnetic tape cartridge having an opening in one sidewall, said case comprising:

a housing having walls defining a socket adapted to receive the cartridge, and a shoulder projecting from one of said walls into said socket adjacent the bottom of the socket, said shoulder being spaced from the opposite wall to afford movement of a cartridge therebetween and being positioned to engage the opening of a said cartridge fully received in said socket; and

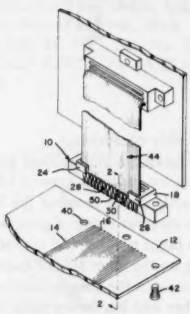
biasing means in said socket adapted for engaging a cartridge inserted in the socket in an off center position adjacent said shoulder to bias the cartridge both for movement out of said socket and for rotational movement to engage the opening in a cartridge fully received in said socket over the shoulder and thereby releasably retain the cartridge within the socket when the cartridge is pressed into said housing by an external force applied between said position and the farthermost edge of the cartridge, said rotational force being opposable by a force applied between said position and the adjacent edge of the cartridge to separate the opening and shoulder and allow removal of the cartridge under the influence of the biasing means.

4,087,146

FLAT FLEXIBLE CABLE SURFACE MOUNT CONNECTOR ASSEMBLY

William Jeffrey Hudson, Jr., Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 27, 1976, Ser. No. 709,031
Int. Cl.[2] H05K *1/12*
U.S. Cl. 339—17 F **7 Claims**



1. A connector assembly for electrically interconnecting a plurality of conductors in a flat flexible circuit with a like plurality of conductors on a rigid surface comprising:

an elongated electrical insulating block having first and second adjacent surfaces extending normal to each other,

means on said first surface for engaging end and side edges of a cable so as to restrain both the longitudinal and lateral motion thereof;

a like plurality of parallel spaced contact receiving recesses in said second surface extending from and normal to said first surface;

means to detachably mount said insulating block on said rigid surface; and

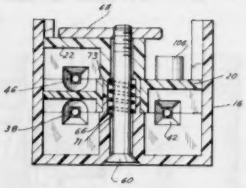
a plurality of electrical contacts formed of resilient conductive material having on a first end means for engaging respective conductors of said cable and lying along said first surface and on the opposite end a surface engaging portion bent in the plane of the contact to extend substantially normal to said first end to lie in said recesses in said second surface with a bowed configuration projecting at least partially from said recesses to resiliently engage said conductors on said rigid surface, each said bowed portion including an embossed rib extending therealong.

4,087,147

TRACK LIGHTING SYSTEM CONNECTOR

Louis F. Silvestris, Bayonne, and Arthur Silverman, Short Hills, both of N.J., assignors to Keene Corporation, New York, N.Y.

Filed Dec. 23, 1976, Ser. No. 753,850
Int. Cl.[2] H01R 9/00, 13/60
U.S. Cl. 339—21 R 4 Claims



1. A connector for use in a track lighting system, said connector comprising: a generally rectangularly shaped housing formed of at least two nonconductive members, one of said members overlying the other;

a first cavity extending through the housing at the interface of said members, said cavity terminating in at least two openings on the surface of the housing extending through opposite sides of said housing;

a first electrically conductive contact positioned within said cavity, said contact including a tab portion extending into a path aligned with one of said openings, said tab portion having surfaces contoured to engage and secure an electrical conductor positioned into said one opening and to pooise the removal of said electrical conductor from said one opening;

fastener means securing said housing members together thereby causing said contact portions to securely engage said electrical conductor, said fastener means including a first fastener at one of said opposite sides and a second fastener at the other of said opposite sides;

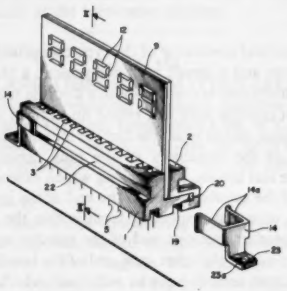
and, coil spring means disposed within said housing extending about one of said fasteners and biased to urge at least one of said members in the direction of the axis of said one fastener to facilitate separation of said members when said one fastener is loosened.

4,087,148

ELECTRICAL CONNECTOR WITH ZERO INSERTION FORCE

Gerhard Bäuerle, Willsbach, Germany, assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Jan. 19, 1976, Ser. No. 650,193
Claims priority, application Germany, Jan. 22, 1975, 2502521
Int. Cl.[2] H01R 13/62
U.S. Cl. 339—75 MP 24 Claims



1. An electrical connector assembly for receiving a contact carrier in the form of a flat plate having a plurality of spaced conductive contact fingers along a front edge thereof, said assembly comprising:

an elongated connector body including a lateral sidewall and containing a plurality of electrical spring contacts, a portion of each of said spring contacts extending slightly beyond said lateral sidewall of said body and positioned to contact one of said fingers of said contact carrier when said carrier lies adjacent said lateral sidewall of said body;

an elongated clamping member clampable against the rear edge of said carrier opposite said front edge; and

clamping means on said connector body and said clamping member for effecting movement of said carrier against the biasing force of said spring contacts into a surface-to-surface engagement with said lateral sidewall of said body, thereby clamping said carrier between said connector body and said clamping member with said fingers in electrical contact with said spring contacts,

said clamping means comprising a spring clamp having spaced arms for embracing respective outer walls of said body and clamping member adjacent their ends,

said body and said clamping member each having a longitudinal groove along its outer wall for receiving a respective arm of said spring clamp, and

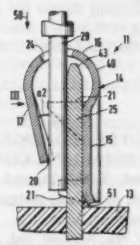
said clamping means including a screw for drawing said arms together against said outer walls.

4,087,149

ELECTRICAL PLUG CONNECTIONS

Karl Fischer, Am Gaensberg 23, 7519 Oberderdingen, Germany

Filed Dec. 15, 1976, Ser. No. 750,783
Claims priority, application Germany, Nov. 28, 1975, 2553558
Int. Cl.[2] H01R 7/04
U.S. Cl. 339—95 D 21 Claims



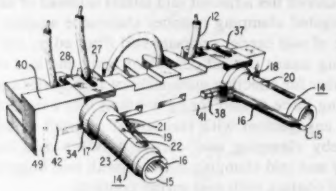
1. A terminal connector for connecting an electrical terminal member to at least one electrical lead, comprising a bow-shaped resilient clamping member which has a base limb, at least one clamping limb and a back interconnecting said limbs, said limbs being adapted to receive said terminal member therebetween with said base limb juxtaposed and parallel to said terminal member, said back having an opening through which said lead is adapted to be inserted, said inserted lead being clamped by said clamping limb against said terminal member, said calmping limb having a sharp means for engaging said lead, said clamping limb having a configuration inclined acutely to said base limb in the direction of said lead insertion, and said acutely inclined configuration of said clamping limb being at a relatively flat angle, so that said inserted lead is adapted to be removed in the opposite direction to the direction of insertion without using a releasing tool.

4,087,150

QUICK CONNECT WIRING SYSTEM FOR BREADBOARD CIRCUITS

Peter Steve Kubik, South Plainfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jun. 27, 1977, Ser. No. 810,402
Int. Cl.[2] H01R *9/08*
U.S. Cl. 339—97 P **10 Claims**



1. Apparatus for mounting electrical circuit components and for facilitating interconnection of said components by insulation-covered conductors comprising:

an insulative board having a planar array of apertures therethrough;

a plurality of electrically conductive connectors, at least one of said connectors engaging at least one of said apertures, each of said connectors including,

means at one end for accepting a terminal pin of one of said electrical circuit components,

oppositely directed spring means internal to said accepting means for holding said terminal pin in electrical and mechanical contact with said connector, and

first and second means at an opposite end of said connector for effecting insulation penetrating wire connections with said insulation-covered conductors, said first and second means being spaced apart and laterally offset from one another; and

insulative means intermediate said first and second effecting means and along at least an outer edge of one of said first and second effecting means, said insulative means extending outwardly from said board to a point beyond said first and second effecting means for improving the electrical isolation among termination points of said conductors and further supporting said conductors in a spaced-apart relationship.

4,087,151

PRINTED CIRCUIT CARD EDGE CONNECTOR WITH NORMALLING CONTACTS

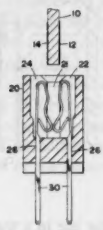
Lawrence A. Robert, Richfield, and Richard A. Gunderson, Eden Prairie, both of Minn., assignors to Magnetic Controls Company, Minneapolis, Minn.

Continuation of Ser. No. 709,440, Jul. 28, 1976, abandoned. This application May 26, 1977, Ser. No. 800,731
Int. Cl.[2] H01R *33/30*
U.S. Cl. 339—176 MP **6 Claims**

1. A printed circuit card edge connector with normalling make-before-break contacts comprising:

an insulating housing having an opening on the top side adapted to receive a printed circuit card with electrical contacts thereon, said opening including a plurality of pockets suitable to mount a plurality of contact elements therein;

at least one pair of contact elements mounted in said pockets so as to receive said card therebetween and make contact with the electrical contacts on the card, each of said elements having a shape that includes a first generally straight portion extending at its bottom end away from said opening and out of the housing through first and second separate openings to permit electrical connection thereto, each pair of elements having one of said first straight portions extending out of the housing through the first opening and the other of said first straight portions extending out of the housing through the second opening separate from and electrically insulated from said first opening, the top ends of said first straight portions being curved over to form first hump shaped contact surfaces, said pair of elements positioned in the pockets so as to have their first hump shaped contacts protruding toward each other, said element shape also including a recurved



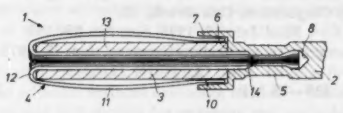
portion extending from the bottom of the curved portion and out from the straight portion a greater distance than the first hump shaped contact to form a second hump shaped portion, said pair of elements positioned in the pockets so as to always have their second hump shaped portions normally contacting each other except when forcibly separated by the insertion of a printed circuit card therebetween.

4,087,152

CONNECTOR ARRANGEMENT

Georg Kolm, Salzachstr. 16, 8260 Muhldorf, Germany

Filed Dec. 20, 1976, Ser. No. 752,309
Claims priority, application Germany, Dec. 22, 1975, 2558003
Int. Cl.[2] H01R *13/06*
U.S. Cl. 339—252 R **6 Claims**

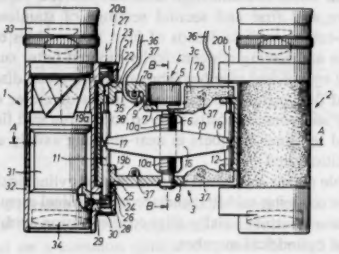


1. In an electrical connector of the type comprised of a male plug component and a female plug component, a plug component which comprises, in combination, a discrete tubular member; a resilient contact wire mat rolled up to have a generally cylindrical shape; and at least one further member constituting at least part of the remainder of the plug component, the rolled-up wire mat having an inner part which extends through the interior of the tubular member, the end of the inner part of the rolled-up wire mat projecting from within the interior of the tubular member past one end of the tubular member, the rolled-up wire mat at the other axial end of the tubular member being bent around so as to have an outer part which surrounds the tubular member and extends longitudinally of the latter, the end of the inner part of the wire mat being clamped to the further member.

4,087,153
BINOCULARS WITH DOUBLE HINGE BRIDGE AND RESILIENT BIASING

Alfred Hengst, Wetzlar-Dorlar, Germany, assignor to Ernst Leitz GmbH, Wetzlar, Germany

Filed Apr. 28, 1975, Ser. No. 571,980
Claims priority, application Germany, May 22, 1974, 2424792
Int. Cl.[2] G02B 7/06, 23/00
U.S. Cl. 350—76 10 Claims



1. Binoculars having a pair of telescope tubes, a bridge, double hinge means having two hinge axes and respectively connecting the bridge to the tubes of the pair, the bridge including a threaded spindle drive for focussing adjustment, the tubes of the pair each including optical focussing elements respectively operated by transfer means being in turn operated by the spindle drive, the improvement comprising:

the bridge being hollow and the transfer means including transfer rods extending parallel to the axis of the spindle drive, and being slidably disposed inside the bridge for respectively sliding on said hinge axes, said transfer rods extending from the bridge and constituting part of the hinge means;

the transfer means further including additional elements respectively extending transversely from the transfer rods into the tubes and being respectively connected to the transfer rods for being driven from the rods and further being coupled to the focussing elements respectively of the two tubes for causing the focussing elements to follow movement of the rods parallel thereto;

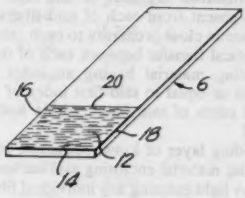
a single resilent transverse element disposed in the bridge and having a central part threadedly engaging and resiliently bearing against the threaded spindle drive for driving engagement therewith, the element having lateral ends extending transversely to and from the spindle drive and resiliently bearing against the transfer rods for tensionally coupling said transverse element and the transfer rods in the direction of the hinge axes and for causing a form closed connection between the central part of the transverse element and the threaded spindle drive thus eliminating play and blacklash in the threaded engagement of the spindle at the transverse element.

4,087,154
GLASS SLIDES WITH MATTED AREAS

Gerhard Menzel, Brunswick, Germany, assignor to Propper Manufacturing Co., Inc., Long Island City, N.Y.

Continuation of Ser. No. 267,329, Jun. 29, 1972, abandoned.
This application Nov. 1, 1974, Ser. No. 520,398
Int. Cl.[2] G02B 21/34
U.S. Cl. 350—92 7 Claims

1. A glass microscope slide having a specimen support area and adjacent coplanar matted ground area suitable to render writings thereon clearly legible which area along with the remainder of the slide is free of any particles of glass, the slide being of a rectangular configuration having on one surface an end edge and parallel front and rear edges extending perpendicularly from said end edge, the matted area extending from said end edge across the slide between said front and rear edges thereof and terminating in an edge which is parallel to said end edge, said matted area being composed of matting lines which

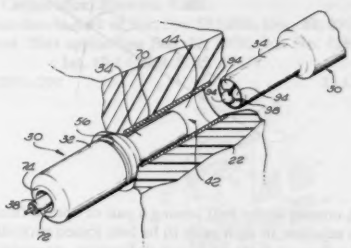


are parallel to each other, said lines being parallel to said end edge.

4,087,155
SINGLE OPTICAL FIBER CONNECTOR UTILIZING SPHERICAL ALIGNMENT ELEMENTS

George Ronald Deacon, Corona Del Mar, Calif., assignor to International Telephone & Telegraph Corporation, New York, N.Y.

Filed Mar. 23, 1977, Ser. No. 780,259
Int. Cl.[2] G02B 5/14; B23Q 3/00
U.S. Cl. 350—96.21 35 Claims



1. A single optical fiber contact comprising:

a set of equal diameter spheres arranged in closely adjacent, but not necessarily engaging, relationship defining an interstitial space therebetween;

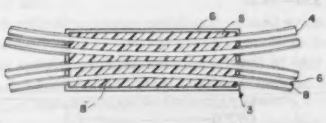
the centers of said spheres lying in a common plane; means for supporting a single optical fiber so that the end portion thereof lies in said interstitial space; and

said spheres being dimensioned to closely confine a fiber in said space.

4,087,156
OPTICAL FIBER TRANSMISSION MIXER AND METHOD OF MAKING SAMF

Charles K. Kao, and James E. Goell, both of Roanoke, Va., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Filed Nov. 7, 1975, Ser. No. 630,118
Int. Cl.[2] G02B 5/16
U.S. Cl. 350—96.21 15 Claims



9. An integral optical transmission mixer having improved optical coupling efficiency comprising:

a plurality of optical fibers each having a light transmissive core of a first index of refraction and a light reflective cladding of lower refractive index than said core;

a region intermediate the ends of said fiber wherein said cladding is absent from each of said fibers and wherein said fibers are in close proximity to each other to promote efficient optical transfer between each of the fibers;

an encapsulating material having an index of refraction greater than or equal to said first index of refraction enclosing the cores of said fibers within said intermediate region; and

an outer cladding layer of lower refractive index than said encapsulating material enclosing said encapsulating material whereby light entering any individual fiber is transmitted to the remaining fibers.

4,087,157

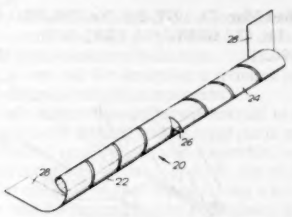
HELICAL SPRING OPTICAL FIBER CONNECTOR AND SPLICE

Robert J. Hodges, Cheshunt, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Oct. 7, 1976, Ser. No. 730,606

Int. Cl.[2] G02B *5/16*

U.S. Cl. 350—96.21 **6 Claims**



1. A connector for butt joining a pair of optical fibers having means adjacent to their ends to be butt joined providing cylindrical reference surfaces of equal diameter, comprising:

a helical spring of strip material having an inner diameter less than the diameter of said cylindrical reference surfaces and adapted to receive said fibers in the opposite ends thereof whereby the coils of the spring will resiliently engage around and grip said fibers;

said helical spring having first and second axial parts;

said first axial part being a right-handed helix and said second axial part being a left-handed helix; and

means on said helical spring for expanding said spring to permit said fibers to be inserted therein.

4,087,158

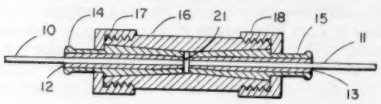
LOW-LOSS SINGLE FILAMENT FIBER OPTIC CONNECTOR WITH THREE CONCENTRIC TAPERED MEMBERS FOR EACH FILAMENTS

Adolph L. Lewis, La Mesa; Daniel E. Altman, and Harold R. Fear, both of San Diego, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 6, 1976, Ser. No. 747,590

Int. Cl.[2] G02B *5/16*

U.S. Cl. 350—96.21 **3 Claims**



1. A connector for removably joining first and second single-filament fiber optic cables in an optically aligned light transmission path comprising:

first and second sections of stainless steel micro-tubing having an inside diameter of the order of five thousandths of an inch for bonding the ends of said first and second fiber optic cables therein, an outside diameter of the order of five times the inside diameter, and slightly tapered end portions;

first and second terminal members of a first metal having internal bores therethrough dimensioned and tapered to receive said first and second sections of stainless steel micro-tubing with said ends of fiber optic cables bonded therein and having concentrically tapered outer surfaces;

a central cylindrical member fabricated of a metal dissimilar to said first metal and having an inside diameter dimensioned and concentrically tapered to receive said first and second terminal members in near-abutting axially aligned disposition; and

removable means supported on said central cylindrical member for retaining said first and second terminal members in said near-abutting axially aligned disposition within said central cylindrical member.

4,087,159

SELF IMAGING SYSTEM USING A WAVEGUIDE

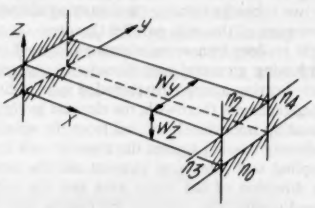
Reinhard Ulrich, Leonberg-Silberberg, Germany, assignor to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Gottingen, Germany

Filed Sep. 19, 1975, Ser. No. 615,115

Claims priority, application Germany, Sep. 20, 1974, 2445150; Feb. 14, 1975, 2506272; Mar. 13, 1975, 2511046

Int. Cl.[2] G02B *5/14, 5/16, 5/17*

U.S. Cl. 350—96.12 **47 Claims**



11. An imaging system for the at least one-dimensional self imaging of an object comprising a waveguide with reflecting boundary surfaces, wherein the distance L between the object and the image measured along the axis of the waveguide, at least one quantity W_{eq} representing the inverse-root-mean-square average transverse dimesion of the guide measured along the imaging dimension, the effective index N_μ of the wave-guide material, and the wave-length λ, satisfy the imaging condition

$$L\lambda = 4hN_\mu W_{eq}^2$$

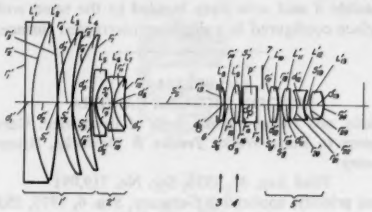
separately for each imaging dimension, wherein h in the case of single imaging is an integer and in the case of multiple imaging is a rationale fractional number, said waveguide having a rectangular cross-section whose transverse dimensions in the object and image planes relate to each other as the desired image magnifications along each imaging dimension.

4,087,160

CAMERA OBJECTIVE OF VARIABLE FOCAL LENGTH

Walter Besenmatter; Trude Muszumanski, both of Vienna, and Irmgard Wendisch, Trumau, all of Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed Dec. 3, 1976, Ser. No. 747,207
Claims priority, application Austria, Dec. 5, 1975, 9297/75
Int. Cl.[2] G02B *15/18*
U.S. Cl. 350—184 **8 Claims**



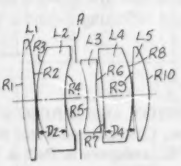
1. In a camera objective of variable focal length including a varifocal forward lens group and a fixed-focus rear lens group centered on a common optical axis, said forward lens group consisting of a substantially axially fixed positive first component, an axially shiftable negative second component, an axially shiftable negative third component and an axially fixed fourth component, said second and third components being displaceable between a wide-angle position of minimum overall focal length and a telephoto position of maximum overall focal length with maintenance of an invariant image plane behind said rear lens group, said third component approaching said fourth component more closely in said telephoto position than in said wide-angle position, the combination of said first, second and third components being of dispersive character, the improvement wherein said first, second and third components have lens diameters sufficient for full illumination of said fourth component by axially incident light rays in said wide-angle position but wherein said third component has an effective area sufficient for full illumination of said fourth component by a bundle of axially incident light rays in said wide-angle position but restricting said bundle to less than full illumination of said fourth component in said telephoto position.

4,087,161

LENS

Richard M. Altman, Woodland Hills, Calif., assignor to Vivitar Corporation, Santa Monica, Calif.

Filed Jun. 3, 1976, Ser. No. 692,550
Int. Cl.[2] G02B *9/60*
U.S. Cl. 350—217 **1 Claim**



Lens	Surface	Radius (mm)	Axial Distance Between Surfaces	N_d	V_d
	R1	59.337			
L1			3.334mm	1.697	55.5
	R2	−287.040			
			0.200		
	R3	30.166			
L2			8.545	1.697	55.5
	R4	30.948			
			6.296		
	R5	−30.318			
L3			2.227	1.847	23.8
	R6	49.594			
			1.817		
	R7	−82.027			
L4			9.000	1.804	46.5
	R8	−37.206			
			0.200		
	R9	126.618			
L5			4.602	1.804	46.5
	R10	−38.708			

1. A lens having five elements from object to image end comprising a first positive element, a second meniscus element concave to the image end, a third bi-concave element, a fourth meniscus element concave to the object end, and a fifth double convex element, said lens being defined substantially as follows as scaled to an equivalent focal length of 50mm, and a semi-field angle of 23.2°:

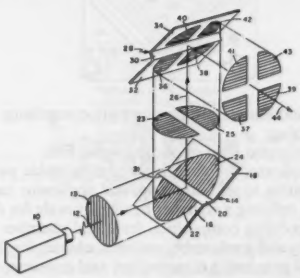
Where N_d is the index of refraction, V_d is the Abbe number, L1–L5 are the lens elements from object to image end, and R1–R10 are the surface radii of elements L1–L5.

4,087,162

FULL POWER OPTICAL SYSTEM WITH DISPLACED BEAM PARTS

Fernand Bannie Kuffer, Brea, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Continuation-in-part of Ser. No. 533,906, Dec. 18, 1974, abandoned. This application Sep. 22, 1976, Ser. No. 725,592
Int. Cl.[2] G02B *5/08, 27/14*
U.S. Cl. 350—299 **13 Claims**



1. An optical system comprising:
first reflective means for receiving a beam of light incident upon said reflective means along a first optical axis,
a second optical axis angularly displaced from said first optical axis,
said first reflective means comprising spaced reflective surfaces for reflecting substantially all of said beam incident upon said surfaces as first and second beam parts,
said first and second beam parts being reflected parallel to one another along said second optical axis and being axially spaced from one another with respect to said first optical axis,
a third optical axis angularly displaced from said second optical axis,
a second reflective means positioned on said second optical axis and comprising spaced reflective surfaces for reflecting, in spaced portions, substantially all of said first and second beam parts incident on said second reflective means along said third optical axis,
a set of processing optics positioned to intercept said portions of said first and second beam parts, said processing optics having a frame structure and an optical structure,

said optical structure being positioned on said frame structure between the position of said beam parts,

means for redirecting said beam parts after said beam parts have passed said frame structure to cause said beam parts to be incident upon said optical structure.

4,087,163

PHOTOGRAPHIC PROCESSING FLUID APPLICATOR

Robert J. Eli, Malden, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 525,347, Nov. 20, 1974, abandoned, which is a continuation-in-part of Ser. No. 418,655, Nov. 23, 1973, abandoned. This application May 14, 1976, Ser. No. 686,586

Int. Cl.² G03C *11/00*

U.S. Cl. 352—130 **6 Claims**

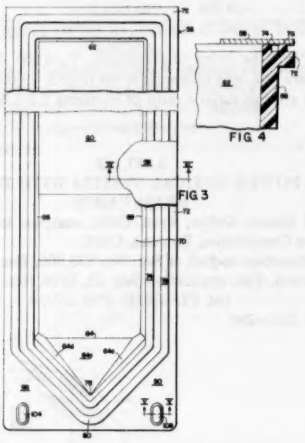


FIG. 4

FIG. 3

1. A motion picture film cassette comprising:

a housing;

an elongated strip of photographic film;

an applicator for applying a photographic processing composition to said film strip, said applicator including means for defining a chamber having a nozzle for dispensing said processing composition from said chamber onto said film strip and a releasably sealed container for initially storing said processing composition, said container comprising an open sided receptacle having a peripheral wall portion extending around and defining its opening, and a flexible web releasably bonded to said peripheral wall portion whereby a portion of said web serves as a sealing cover over said opening to initially retain the processing fluid in said container, said web being provided with an extension for purposes of selectively peeling said web progressively away from said peripheral wall portion of said container to effect the release of the processing composition from said container, said chamber being positioned to receive the processing fluid from said container when it is so released;

means for causing said extension of said web to fold back over said portion of said web and actuable for selectively exerting a pulling force on said extension of said web in a direction causing said fold to move across said receptacle to peel said web away from said receptacle whereby the processing fluid is released from said container into said chamber; and

means for progressively advancing said film strip across said nozzle to facilitate the formation of a coating of processing composition thereon, said peripheral wall portion of said receptacle being configured to present two spaced apart continuous surfaces each extending around said receptacle to face outwardly of its said opening and bonded to said portion of said flexible web, the width of each said surface representing a substantial and significant portion of the combined width of said surfaces, the combined width of said surfaces being selected to permit said web to be peeled away from said receptacle responsive to a predetermined minimum force exerted on said web extension, said cassette being thus able to undergo greater shocking without complete rupture of said bond between said portion of said web and said surfaces than would be possible if said web were bonded to the same width of surface configured as a single uninterrupted surface.

4,087,164

MOTION PICTURE CAMERA

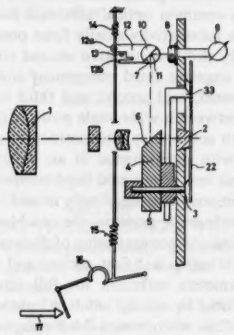
Kurt Bode, and Heinz Vehrke, both of Brunswick, Germany, assignors to Rollei-Werke Franke & Heidecke, Brunswick, Germany

Filed Aug. 31, 1976, Ser. No. 719,091

Claims priority, application Germany, Sep. 6, 1975, 2539792

Int. Cl.² G03B *7/08*

U.S. Cl. 352—141 **7 Claims**



1. A motion picture camera comprising a lens, a shutter mounted for rotation when the camera is operating and remaining stationary when the camera is not operating, a reflecting surface on said shutter for reflecting light received through said lens, exposure metering means including a light sensitive element responsive to light received from said reflecting surface on said shutter, and light reflecting means operatively interposed in a path of travel of light from said reflecting surface on said shutter to said light sensitive element, said reflecting means being mounted for movement from a first position when said shutter is rotating to a second position when said shutter is stationary, said movable reflecting means being arranged to transmit to said light sensitive element a greater proportion of the light reflected by said shutter when said reflecting means is in its said first position and a lesser proportion thereof when said reflecting means is in its said second position.

4,087,165

FILM TENSION ABSORBING SYSTEM

Vincent S. Pasturczak, Chicago, and Peter S. Mischenko, Mt. Prospect, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Dec. 17, 1975, Ser. No. 641,683

Int. Cl.² G03B *1/56*

U.S. Cl. 352—157 **10 Claims**

1. A film tension absorbing system for absorbing film tension shock within a film strip on a motion picture projector, comprising, in combination:

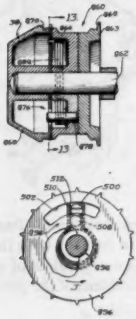
a projector housing;

an exit film guide roller pivotally mounted on the housing

for movement in response to film tension to permit film takeup of a predetermined number of frames;

biasing means for urging the roller toward the film strip and absorbing tension therefrom against the biasing force of said biasing means; and

a tension absorbing sprocket drive means adjacent the roller to permit relative movement of the film strip past the



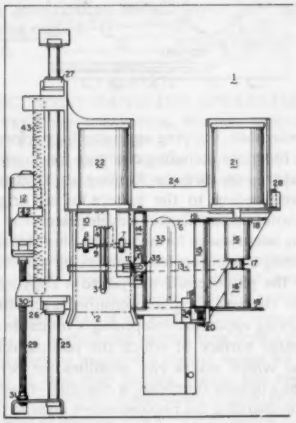
sprocket by a number of frames greater than said predetermined number, said tension absorbing sprocket drive means comprising a sprocket wheel and a sprocket tooth ring rotatably mounted for conjoint rotation therewith, said sprocket tooth ring being rotatable relative to said sprocket wheel in a reverse direction to absorb tension within the film strip to thereby increase the tension absorbing capabilities of the projector.

4,087,166

MICROFICHE ROLL REPRODUCER

Michael Rothbart, Tarzana, and Tor H. Petterson, Rancho Palos Verdes, both of Calif., assignors to Terminal Data Corporation, Woodland Hills, Calif.

Filed Mar. 2, 1976, Ser. No. 663,030
Int. Cl.[2] G03B *21/11, 23/12*
U.S. Cl. 353—26 A **9 Claims**



1. A microfiche reproducer for indexing a particular microfiche frame to a viewing position from amongst a plurality of microfiche, comprising:

(a) a single roll of film (6), which film has code markings (38–41) adjacent to an edge that uniquely identify each microfiche frame as to column,

(b) illumination means (33) to illuminate both said microfiche frame at said viewing position and individually said code markings pertaining thereto,

(c) first means (21,16) to move said film forward,

(d) second means (22, 3) to move said film backward,

(e) third means (12) to move said film transversely,

(f) sensing means (49) spatially related to said film and said viewing position to respond to illumination as modified by said code markings,

(g) further sensing means (42) responsive to the transverse position of said film,

(h) first code means (58) to form an electrical representation corresponding to said code markings that uniquely identify the particular said microfiche frame as to column,

(i) second code means (80) to form an electrical representation corresponding to the transverse position of said film, and

(j) electronic logic means (59–88) connected to both of said sensing means, to both of said code means, to said first and second means to thereby tautly move said film to the column of microfiche frames in which said particular microfiche frame lies, and to said third means to select the row of microfiche frames in which said particular microfiche frame lies,

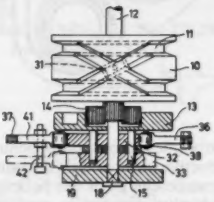
by comparing the outputs of both of said sensing means and said code means.

4,087,167

DUAL PHOTOGRAPHIC SLIDE PROJECTOR

Hermann Friedrich Albrecht, Hotzum, Germany, assignor to Rollei-Werke Franke & Heidecke, Brunswick, Germany

Filed Aug. 30, 1976, Ser. No. 718,619
Claims priority, application Germany, Sep. 4, 1975, 2539360
Int. Cl.[2] G30B *23/04*
U.S. Cl. 353—116 **8 Claims**



1. A dual photographic slide projector comprising:

(a) first projection means for projecting an image of a first picture slide in a first projection location along a first optical path,

(b) second projection means for projecting an image of a second picture slide in a second projection location along a second optical path,

(c) a single magazine located between said first and second projection means for supplying picture slides to be transferred to and to be returned to the magazine from both said first and second projection locations,

(d) said magazine serving to hold a series of picture slides at substantially uniform spaced intervals,

(e) slide transfer means for transferring slides from said single magazine to said first projection location and other slides from said single magazine to said second projection location and for subsequently returning the respective slides from their respective projection locations to said single magazine,

(f) said first projection location and said second projection location being staggered with respect to each other in the direction of said optical paths so that said first projection location will be opposite one slide in said magazine while said second projection location is opposite a next adjacent slide in said magazine,

(g) a magazine feed member (1, 6) having a part (4) adapted to engage said magazine in feeding relation thereto,

(h) rotary drive means (10, 11, 12, 31) for moving said part (4) forward and backward through a distance of at least one of said spaced intervals upon each rotation of said drive means,

(i) means (9) for engaging said part (4) with said magazine during at least part of the forward and backward movement of said part, and

(j) control means (13, 20, 26) for disengaging said part (4) from said magazine during movement of said part in one direction,

(k) said control means including a rotary cam member (13) driven from said rotary drive means (10).

4,087,168

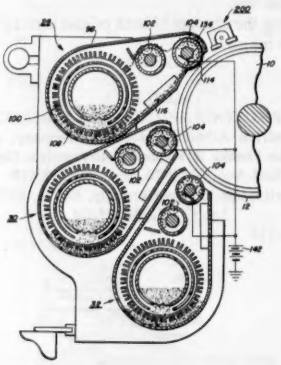
CHARGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE

Lawrence J. Fraser, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 19, 1976, Ser. No. 650,399

Int. Cl.[2] G03G *15/00, 15/02*

U.S. Cl. 355—3 CH **2 Claims**



1. In an electrostatic reproduction machine, the combination of a photoconductive member, first charging means to place a uniform electrostatic charge of one polarity on the surface of said photoconductive member in preparation for imaging, exposure means to expose said photoconductive member without changing said one polarity to an original being reproduced and thereby selectively discharge said photoconductive member in accordance with the original being reproduced to form a latent electrostatic image in said one polarity of the original on said photoconductive member, and, second charging means for subjecting said latent electrostatic image formed on said photoconductive member to a charge of said one polarity to restore to said latent electrostatic image at least a part of the charge originally provided on said photoconductive member by said first charging means on the exposed areas of said latent electrostatic image without forming a second image whereby to reduce the charge differential between exposed and non-exposed areas.

4,087,169

TRANSFER ROLLER SYSTEM

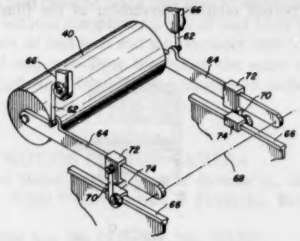
Joseph Fantuzzo, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 631,987, Nov. 14, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,821

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—3 TR **4 Claims**

1. An improved combination of a photoreceptor mounted for movement around a closed path and a transfer roller system for transferring a developed electrostatic image from the photoreceptor to a transfer member, the transfer roller system including a transfer roller in contact with the photoreceptor, and means for mounting the roller to pivot about an axis so that the roller can move in a direction which is at least generally perpendicular to the surface of the photoreceptor, wherein the



improvement comprises means including a negator spring for maintaining the roller in contact with the photoreceptor with a force which is constant regardless of any pivotal movement of the roller during movement of the photoreceptor around the closed path.

4,087,170

ELECTROSTATIC COPYING APPARATUS WITH COMBINED CHARGING TRANSFER UNIT

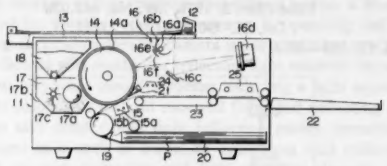
Eiji Sawaoka, Zama, and Shinichi Hashimoto, Fujisawa, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Jun. 9, 1976, Ser. No. 694,435

Claims priority, application Japan, Jun. 13, 1975, 50/71716; Jun. 13, 1975, 50/80524[U]

Int. Cl.[2] G03G *15/16*

U.S. Cl. 355—3 CH **12 Claims**

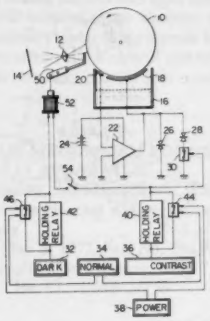


1. An electrostatic copying apparatus for performing a series of copying functions including charging for charging a photosenstiive layer, exposure for forming an electrostatic latent image corresponding to the pattern of an original on the charged photosensitive layer, development for turning the electrostatic latent image formed on the photosensitive layer to a visible image, transfer for transferring the visible image formed on the photosensitive layer to a copying paper, and cleaning for cleaning the photosensitive layer after the transfer; the copying apparatus comprising a rotatable drum on the circumferential surface of which the photosensitive layer is formed and which makes two rotations for performing the series of the copying functions, a charging-transfer combination unit for charging the photosensitive layer in the first rotation of the rotatable drum and performing transfer in the second rotation, said combination unit facing the photosensitive layer of the rotatable drum, an exposure unit performing the exposure function and facing the photosensitive layer of the rotatable drum, a development unit performing the development function and facing the photosensitive layer of the rotatable drum, and a cleaning unit performing the cleaning function and facing the photosensitive layer of the rotatable drum.

4,087,171
ELECTROPHOTOGRAPHIC EXPOSURE AND DEVELOPMENT SYSTEM

Takashi Yano, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 624,207
Claims priority, application Japan, Oct. 21, 1974, 49/121120
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—14 **22 Claims**



1. An electrophotographic method utilizing a developing electrode to develop an electrostatic image formed on a photoconductive member, comprising the steps of:

(a) radiating at one of a first predetermined intensity and second predetermined intensity a light image of an original document onto the photoconductive member to form the electrostatic image, the second predetermined intensity being lower than the first predetermined intensity;

(b) sensing an electrostatic potential of a background area of the electrostatic image;

(c) applying a biasing voltage to the developing electrode in accordance with the sensed electrostatic potential; and

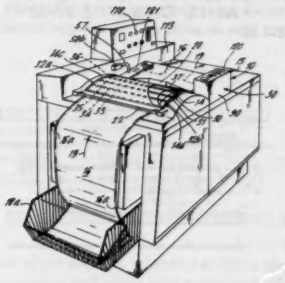
(d) limiting the biasing voltage to one of a first upper limit and a second upper limit which is higher than the first upper limit, both the one of the first and second predetermined intensities and the one of the first and second upper limits being selected to copy the original document depending upon contrast and density of the original document being copied.

4,087,172
DOCUMENT HANDLING APPARATUS

Marc Carlo Van Dongen, Zaventem, Belgium, assignor to Rank Xerox Ltd., London, England

Filed Mar. 30, 1976, Ser. No. 671,797
Claims priority, application United Kingdom, May 6, 1975, 19000/75
Int. Cl.[2] G03G *15/00*
U.S. Cl. 355—14 **2 Claims**

1. A document strip handling means for converting a copying machine which copies separated original documents to copying original documents interconnected in succession with one another in the form of an endless strip comprising strip feeding means for feeding said endless strip across an exposure station of said copying machine, a control means for regulating the operation of said strip feeding means and said copying machine to produce copies of individual original documents on said endless strip as desired, and a support means for said strip feeding means and said control means, said support means being readily fixable in predetermined position on said copying machine to convert said machine from copying separated original documents to original documents interconnected in the form of said endless strip and being readily removable from said machine for reconversion of said machine back to copying separated original documents, said support means including a base adapted to rest on a surface of said copying machine, said base having pin means projecting downwardly for engagement with mating openings on said machine surface to fix said support means in predetermined position, at least one of said pin means having a plurality of contacts for electrically coupling said support means with said copying machine, said control

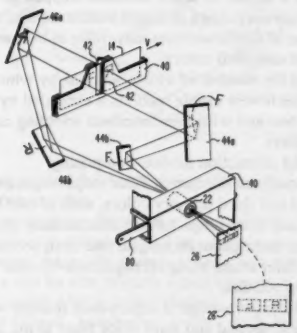


means including a first counter means which records the total number of original documents from said endless strip which have been copied with the strip feeding means in position and a second counter means which records the total number of copies from the original documents on said endless strip made by the machine with the strip handling means in position.

4,087,173
DOCUMENT PHOTOGRAPHY SYSTEM

Jack Beery, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Sep. 15, 1976, Ser. No. 723,361
Int. Cl.[2] G03B *27/32*
U.S. Cl. 355—24 **25 Claims**



1. A photography system for photographing an object field having relative motion at a known velocity comprising:

film means responsive to incident light energy representative of the moving object field for forming a recorded image thereof;

lens means for receiving at a first dimension incident light energy representative of the moving object field and reducing it to a second dimension suitable for recording by said film means; and

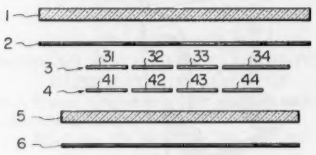
lens actuator means for actuating said lens means to track the moving object field at a second velocity in timed relation to said known velocity and in relation to the dimensional reduction of said lens means, said lens means moving relative to said record means during said tracking of said moving object field.

4,087,174

COLOR CORRECTION METHOD FOR PANCHROMATIC PRINTING AND ITS DEVICE

Naoji Nishikawa, 5-43 Nishihara-cho 4-chome, Tanashi-shi, Tokyo, Japan

Filed May 7, 1976, Ser. No. 684,394
Claims priority, application Japan, May 15, 1975, 50-58382
Int. Cl.[2] G03B 27/32, 27/52
U.S. Cl. 355—32 10 Claims



1. In a method for making panchromatic prints from a panchromatic negative film by the subtractive process, the steps comprising:

passing a white light through a panchromatic negative film;

mixing up uniformly by means of a diffuser said passed white light;

passing said mixed up light through first, second and third side-by-side filters respectively of first, second and third subtractive primary colors, each of said first, second and third filters being graded in several steps from relatively low to relatively high density;

performing panchromatic printing with the light passed by said filters and producing a test color print carrying for each of said first, second and third subtractive primary colors a series of color sections stepped in decreasing color intensity down to a least visible section, wherein the number of visible sections may differ as between said first, second and third colors;

detecting the number of visible sections by which the series with the fewest visible sections is exceeded by each of the other two and with these numbers selecting color correction filters.

4. A color correction device, comprising:

first, second and third color filter strips respectively of first, second and third primary colors, each of said first, second and third filter strips having substantially uniform color density throughout its length, said first, second and third color filter strips being arranged side-by-side in nonoverlapping relation;

a neutral density wedge in superposed relation with each of said first, second and third color filter strips, each neutral density wedge including a series of increasing density steps distributed progressively along the length of its corresponding color filter strip, the number of color density steps for a given one of said first, second and third colors being the number of neutral density wedge steps in said superposed relation with said color filter strip;

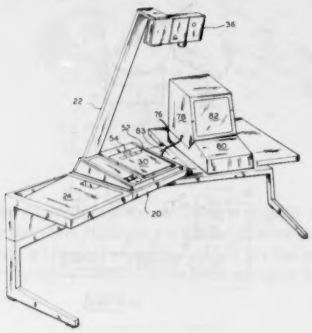
substantially opaque pattern sheet means in superposed relation with said first, second and third color filter strips and also with said neutral density wedge of each thereof, said pattern sheet means having light transmitting sections superposed on corresponding wedge steps for each of said first, second and third color filter strips and thereby providing a row of light transmitting sections for each said color filter strip, said color filter strips, neutral density wedges and pattern sheet means being superposed as a single unit.

4,087,175

AUTOMATIC MICROFILM CAMERA OPERATED RESPONSIVE TO DATA INPUT AT A COMPUTER TERMINAL

Delmar R. Johnson, Barrington, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Feb. 16, 1977, Ser. No. 769,373
Int. Cl.[2] G03B 27/52, 27/32
U.S. Cl. 355—40 20 Claims



1. A process for recording data in a work station comprising a computer terminal, a document stand, and a camera focused on the document stand, the inventive process comprising the steps of:

(a) entering data in said computer terminal responsive to information read from a document while said document is resting on said stand,

(b) displaying identifying information coordinated with the entered data, said information display being located near said document as it rests on said stand and being displayed responsive to the step (a) act of entering said data into said computer terminal,

(c) taking a picture containing both said document and said coordinated information display, and

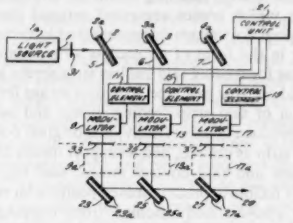
(d) locating said document stand at a position convenient to an operator who is entering said data in said computer terminal, whereby said document and coordinated information display are photographed without disturbing the data entry function.

4,087,176

SYSTEM FOR OVERALL COLOR CORRECTION OF COLOR PICTURE INFORMATION CONTAINED IN A PROJECTING MULTI-COLOR LIGHT BEAM

Jurg Nigg, Beckenhofstrasse 30, 8006 Zurich, Switzerland

Continuation-in-part of Ser. No. 424,040, Dec. 12, 1973, abandoned. This application Jul. 12, 1976, Ser. No. 704,728
Int. Cl.[2] G03B 27/76
U.S. Cl. 355—35 24 Claims



1. A system for color correction of color picture information contained in a projected multi-color light beam in photo-

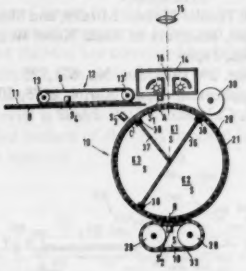
graphic or cinematographic equipment, comprising: means to produce a plurality of mono-color light beams each of a different primary color, and each with complete picture contour- and single-color-information, according to the distribution of said color in said color picture, over their cross-sections; a respective field control type light modulator in the path of each of said mono-color light beams, each of said modulators being operable to continuously vary the light intensity of each of said mono-color beams, each of said light modulators having a respective electric control input element to provide said modulators with intensity controlling signals for continuously variable modulation affect, and a control unit connected to said control elements to remotely control said modulators.

4,087,177

SHEET CONVEYOR MECHANISM FOR REPRODUCING APPARATUS

Peter Gumm, Glashutten, and Horst Witte, Wiesbaden, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 5, 1977, Ser. No. 794,067
Claims priority, application Germany, May 7, 1976, 2620138
Int. Cl.[2] G03B *27/58*
U.S. Cl. 355—47 **28 Claims**



1. A sheet conveying mechanism for an original to be reproduced in a reproducing apparatus, comprising:

means, including a rotatable drum having an air-permeable circumferential shell surface, for supporting the original;

non-rotatable means disposed within said drum for dividing the space within said drum and the circumferential shell surface of the drum into three separate regions;

means associated with said drum for selectively producing positive and negative pressure within each of said separate drum regions;

means for exposing and scanning the original, positioned adjacent a first one of said separate drum regions;

means, associated with said drum and being responsive to movement of the original around said drum, for controlling said pressure-producing means; and

first and second means, cooperating with said drum and located adjacent the circumferential shell surface of the drum in the area of a second one of said separate drum regions, for transporting the original around the drum.

4,087,178

SHEET-HOLDING CASSETTE FOR COPYING MACHINE

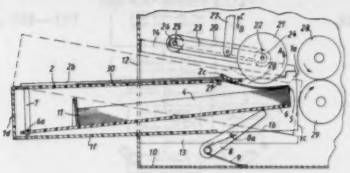
Josef Pfeifer, Unterhaching; Günther Schnall, Eching; Klaus Aldenhoven, Unterpfaffenhofen, and Hanns Blöchl, Unterhaching, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Apr. 22, 1977, Ser. No. 790,135
Claims priority, application Germany, Apr. 24, 1976, 2618089
Int. Cl.[2] G03B *27/58*
U.S. Cl. 355—72 **10 Claims**

1. In combination with a copying machine having a paper-advance element and means for reciprocating said element toward and away from a paper-supply location, a copy-sheet cassette comprising:

a box shaped to hold a stack of copy sheets and adapted to be held in said machine at said location with said stack engageable by said paper-advance element;

an upper wall on said box extending over said stack, having a smooth upwardly turned surface, and formed with a throughgoing elongated slot opening at said surface;



a guide on said upper surface, whereby an extra sheet can be slid on said surface and along said guide toward said slot; and

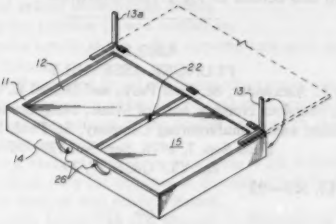
a deflector on said upper wall adjacent said slot and extending upwardly beyond said upper surface, whereby the sheet slid along said upper surface is deflected by said deflector through said slot into said box.

4,087,179

BOOK HOLDER FOR MICROFILMING

Lawrence J. Conkerton, P.O. Box 1166, Baton Rouge, La. 70821

Filed Nov. 19, 1976, Ser. No. 743,239
Int. Cl.[2] G03B *27/62*
U.S. Cl. 355—76 **7 Claims**



1. A holding device for books being filmed by microfilm cameras which comprises

a generally rectangular-shaped, box-like structure, having a bottom, four wals and an upper-hinged, transparent cover, having mounted internally therein at least two book-lifting means in a side by side relation which operate to maintain pressure, against a book resting thereon, in the direction of the upper-hinged, transparent cover, each book-lifting means being independently operable, and

wherein the book-lifting means are guided in an up and down relation to the device by means of vertical guides attached to the inner surface of at least the front and rear walls of the book holding device and wherein the vertical guides are received in matching indentations located in the book-lifting means.

4,087,180

PHOTOGRAPHIC PRINTING METHOD

Robert F. DiNatale, Old Mill Rd., Sutton, Mass. 01527

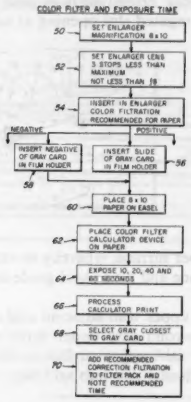
Filed Jan. 28, 1977, Ser. No. 763,326
Int. Cl.[2] G03B *27/32*
U.S. Cl. 355—77 **34 Claims**

1. A method of photographic printing comprising:

making at least one exposure of a simulation of a properly exposed neutral gray card for a film to be printed having

particular D/log E characteristics, and a film-mask-colored element for film having a colored mask, for at least one predetermined period of time on at least one sheet of photographic paper having certain D/log E characteristics;

processing each sheet of paper; and


COLOR FILTER AND EXPOSURE TIME
50
SET ENLARGER MAGNIFICATION 8 x 10
52
SET ENLARGER LENS 3 STOPS LESS THAN MAXIMUM NOT LESS THAN f8
54
INSERT IN ENLARGER COLOR FILTRATION RECOMMENDED FOR PAPER
NEGATIVE
POSITIVE
INSERT NEGATIVE OF GRAY CARD IN FILM HOLDER
INSERT SLIDE OF GRAY CARD IN FILM HOLDER
56
58
60
PLACE 8 x 10 PAPER ON EASEL
62
PLACE COLOR FILTER CALCULATOR DEVICE ON PAPER
64
EXPOSE 10, 20, 40 AND 80 SECONDS
66
PROCESS CALCULATOR PRINT
68
SELECT GRAY CLOSEST TO GRAY CARD
70
ADD RECOMMENDED CORRECTION FILTRATION TO FILTER PACK AND NOTE RECOMMENDED TIME

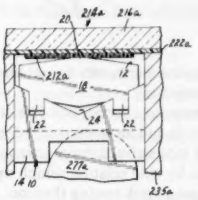
comparing each such exposure of said simulation of a properly exposed gray card to a gray card reference to determine the proper exposure time and the color filtration to be used to print all films having D/log E characteristics generally similar to said particular D/log E characteristics on paper having D/log E characteristics generally similar to said certain D/log E characteristics.

4,087,181

PLUNGER ASSEMBLY

Jerry L. Alexander, St. Paul Park, and Daniel B. Pendergrass, Jr., Mendota Heights, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 7, 1976, Ser. No. 720,996
Int. Cl.² G03B *27/20*
U.S. Cl. 355—92 **6 Claims**



1. In a device for forming graphics along a smooth two layer strip of radiation sensitive material, said device comprising a frame, means for defining an exposure station including a plate mounted on said frame which plate is essentially transparent to radiant energy, means for defining a path for a said strip material through said exposure station adjacent one surface of said plate, a template disposed between said plate and said strip material, said template having at least one area opaque to transparent energy and at least one radiation transmissive area corresponding in shape to a graphic to be formed, a plunger assembly including a soft flexible resilient pad having a pressure surface and a rigid member supporting said resilient pad on its side opposite said pressure surface, and means for mounting said plunger assembly on said frame for movement between a released position with the pressure surface of said pad spaced from said plate to afford movement of said strip along said path and an engaged position with the pressure surface of said pad pressing said strip material against the template and plate at said exposure station, the improvement wherein:

said pad has a hardness of not greater than 35 when measured with a Shore Durometer, Type A, on said pressure surface, has a radiused ridge running centrally across said pressure surface with generally planar portions of said pressure surface on opposite sides of said ridge extending tangentially from said radiused ridge and being disposed at an included obtuse angle of no greater than about 164°, and has a matte finish on said pressure surface; and

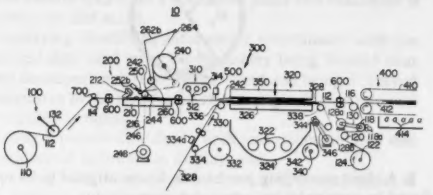
said means for mounting mounts said plunger assembly to first engage said ridge with said strip material with said ridge aligned in the direction of said path and to then displace the material of said pad with the contact between said pressure surface and said strip material increasing at a generally equal rate in both directions transverse of said path from said ridge to sweep air from between the layers of said strip material upon movement of said plunger assembly from said released position to said engaged position.

4,087,182

PROCESS AND APPARATUS FOR PRODUCING A PHOTOPOLYMER PLATE HAVING RELIEF IMAGES THEREON

Hiroaki Aiba, Tokyo; Toshiie Matsui, Mitaka, and Shu Yoshida, Kiyose, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 29, 1976, Ser. No. 671,725
Claims priority, application Japan, Apr. 4, 1975, 50-40346
Int. Cl.² G03B *27/30, 27/02*
U.S. Cl. 355—100 **37 Claims**



21. In an improved apparatus for producing a photopolymer plate having relief image areas thereon, said apparatus comprising:

(a) a liquid photosensitive material applying station;

(b) means for feeding to said station a sheet of protective film material capable of transmitting actinic radiation therethrough;

(c) means for applying a liquid photosensitive material to the upper surface of said sheet of protective film material to form a layer of photosensitive material thereon;

(d) means for laminating a sheet of a backing material onto said layer of photosensitive material to form an assembly of said protective film sheet, said photosensitive material layer and said backing material sheet;

(e) relief exposure means designed to receive said assembly and including a light source for directing the actinic radiation through an image-bearing transparency to said photosensitive material layer;

(f) means for removing said sheet of protective film material from the lower surface of the thus exposed layer of photosensitive material; and

(g) means for removing unhardened non-exposed portions of said layer of photosensitive material to form relief images on said sheet of backing material;

(h) said liquid photosensitive material applying means, said laminating means, said exposure means and said protective film removing means being arranged in series; the improvement comprising:

a pair of parallel and spaced guide rollers defining a sub-

stantially horizontal elongated plane generally along which said series of means are disposed, one of said pair of guide rollers being disposed adjacent to one end of said series of means adjacent to said liquid photosensitive material applying station, the other guide roller being disposed at the other end of said series of means;

means for supplying successive portions of a continuous web of said protective film material into said horizontal plane so that a length of said protective film material extends between said pair of guide rollers substantially in wrinkle-free condition, said sheet of protective film material to which said liquid photosensitive material is applied being a part of said length of protective film material;

a stationary member at said liquid photosensitive material applying station having a substantially flat upper surface disposed in face to face contacting and supporting relationship to said part of said length of protective film material while said part is being coated with said layer of photosensitive material; and

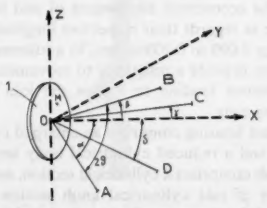
means for generally downwardly pulling the leading end of said length of protective film material around the periphery of said other guide roller so that successive portions of said continuous web of protective film material are travelled from said one guide roller through said series of means to said other guide roller, whereby said photosensitive material layer and said backing material sheet thereon are conveyed by said continuous web of protective film material into said relief exposure means for the exposure of said layer and said protective film material is removed at said other guide roller from the lower surface of the thus exposed layer of photosensitive material.

4,087,183

SPECTROGRAPH

Genevieve Passereau, Bourg-la-Reine, France, assignor to Instruments S.A., Ivry-sur-Seine, France

Filed Mar. 25, 1976, Ser. No. 670,567
Claims priority, application France, Dec. 10, 1975, 75 37803
Int. Cl.[2] G01J *3/18*
U.S. Cl. 356—79 **3 Claims**



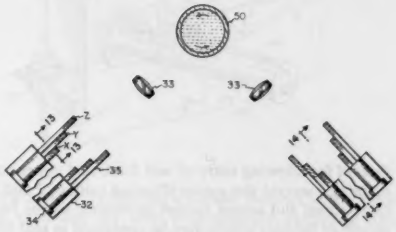
1. A spectrograph for an extended spectral field, including means for defining a source of light to be analyzed and a dispersive system, wherein the dispersive system consists solely of a concave holographic grating, said grating having registration points with coordinates in a relation with the coordinates of the light source to be analyzed to produce tangential focal lines for different wavelengths from said light source which are disposed in the same plane whereby a planar diffraction spectrum is formed in said plane.

4,087,184

METHOD AND APPARATUS FOR INSPECTING LIQUIDS IN TRANSPARENT CONTAINERS

Julius Z. Knapp, Somerset, and John C. Zeiss, Bloomfield, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 505,431, Sep. 12, 1974, Pat. No. 3,966,332. This application Apr. 16, 1976, Ser. No. 677,593
Claims priority, application United Kingdom, Aug. 19, 1975, 34503/75
Int. Cl.[2] G01N *21/24*
U.S. Cl. 356—197 **31 Claims**



1. A method for inspecting illuminated articles wherein each of said articles comprise a liquid-filled transparent container, that may have a multiplicity of optical defects or specular reflections on or in itself which liquid is to be inspected for the presence of foreign particles, said method comprising the steps of:

a. rotating said article to cause the liquid contents to rotate therein,

b. placing the rotating article at an inspection station having associated article illuminating means,

c. stopping the rotation of said container,

d. imaging the article along a first viewing axis with image forming means,

e. while the illuminated liquid continues to rotate, dissecting said article image into a plurality of detection areas which extend from the bottom of the container through the top of the liquid meniscus,

f. monitoring each of said detection areas with individual sensing means only for changes in illumination below the saturation limit of said sensing means,

g. electronically translating said changes in illumination into voltage signals,

h. forming a composite signal of said voltage signals,

i. comparing said composite signal to a standard reference signal and based thereon accepting or rejecting said article for particulate contamination;

whereby the image of said foreign particles which moves past a detection area with a saturated sensing means will be detected as it passes through a detection area with an unsaturated sensing means.

4,087,185

BLOOD LEAK DETECTOR

Rene G. Lamadrid, Silver Spring, Md., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jun. 19, 1975, Ser. No. 588,513
Int. Cl.[2] G01N *21/26*
U.S. Cl. 356—201 **5 Claims**

4. In a detector, comprising

a hydraulic circuit for circulating a fluid, which is to be optically sensed, through a chamber,

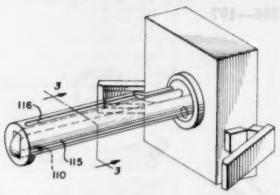
an elongated optical probe for testing the optical transmission of said fluid in said chamber,

said optical probe being releasably and sealingly insertable into said chamber for optical coupling to said fluid,

a substantially cylindrical guard means concentrically surrounding said optical probe such that the longitudinal axis

of the guard means coincides with that of the probe for mechanically protecting said probe against impact or force damage when the probe is being handled and to optically protect said probe against stray light when said probe is in use, and

the improvement wherein said guard means defines a body having an upper portion and a lower portion, said lower portion having a first slot means extending substantially the entire length of said guard means parallel to the axis



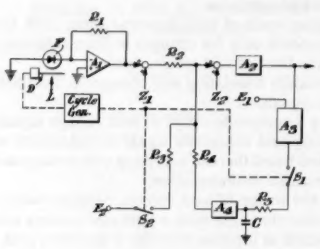
thereof for allowing entry of said fluid, said upper portion defining a second slot means allowing exiting of said fluid, said second slot means further providing means for free escape of bubbles which may be contained in said fluid as it passes through said first slot means and said second slot means, said guard means defining internal surfaces at an angle to the horizontal to facilitate movement of bubbles toward said first slot means, and the first and second slot means being parallel to the longitudinal guard means and probe axes.

4,087,186

LIGHT MEASURING CIRCUIT FOR A PHOTOMETER

Alex Vinatzer, Brixen, Italy, assignor to Durst AG. Fabrik Fototechnischer Apparate, Bolzano-Bozen, Italy

Filed Oct. 1, 1976, Ser. No. 728,847
Claims priority, application Italy, Oct. 16, 1975, 4849 A/75
Int. Cl.² G01J *1/46*
U.S. Cl. 356—226 **10 Claims**



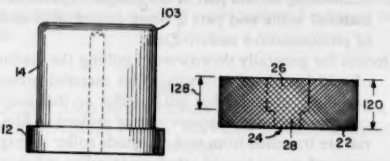
1. In a light measuring circuit having a photocell for generating an electrical signal when light impinges upon it, a darkening device disposed in front of the photocell for alternately shielding the photocell from the impinging light and uncovering it for exposure to the light in a cyclic sequence, the photocell being electrically connected to an indicating circuit and to a signal storage means, a first switching means connected to the signal storage means whereby signals are alternately stored and discharged into the indicating circuit, a cycle generating means connected to the darkening device and to the first switching means whereby signals are stored in the signal storage means when the darkening device shields the light from the photocell and signals are discharged into the indicating circuit when the photocell is exposed to light, the indicating circuit including an amplifier having an input and an output, the output of the amplifier being connected to a logarithmic amplifier in the indicating circuit, the improvement comprising a feedback control loop connecting the output of the logarithmic amplifier to feed back into the indicating circuit, a second switching means being connected in the feedback control loop, the signal storage circuit also being connected in the feedback control loop, a reference current source being connected to the indicating circuit.

4,087,187

LOCKING MECHANISM FOR EXTENSION RODS

Vincent Asaro, 56 Mulberry La., Freehold, N.J. 07728

Filed Aug. 30, 1976, Ser. No. 718,962
Int. Cl.² F16B *7/14*
U.S. Cl. 403—104 **1 Claim**



1. A locking mechanism for use in joining together two tubular extension rods to be fixedly secure in withstanding external pressures comprising:

a housing having a longitudinal axis and a threaded blind bore parallel thereto, but offsettingly disposed with respect therewith;

a knob having a knurled outer periphery and also having a longitudinal axis and a through aperture parallel thereto, but offsettingly disposed with respect therewith; and

said knob aperture having a counterbore to receive the head of a fastening means and which counterbore has an axial length greater than half the total axial length of said aperture;

a headed fastening means for joining said housing and knob together, said means being so disposed and arranged as to pass between the aperture in said knob and the blind bore of said housing;

wherein said housing and said knob are of circular cross-section and wherein the blind bore and aperture thereof are each eccentrically disposed with respect to their respective longitudinal axes;

wherein the amount of eccentrical dispositions of said blind bore and aperture as regards their respective longitudinal axes are substantially equal;

wherein the eccentrical dispositions of said blind bore and aperture as regards their respective longitudinal axes is in the range 0.090 to 0.100 inches, to a tolerance of ± 0.005 inches, to provide a resistance to movement under external pressures tending to loosen the join between said extension rods;

wherein said housing comprises an enlarged cylindrical face section and a reduced cylindrical body section, wherein said knob comprises a cylindrical section, and wherein the diameter of said cylindrical knob section is slightly in excess of the diameter of said cylindrical face section;

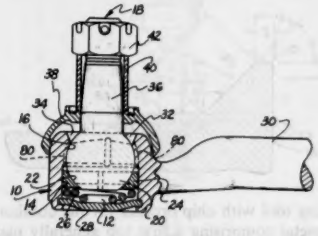
and wherein the diameter of said cylindrical body section is substantially equal to the inner diameter of one of said rods, wherein the diameter of said cylindrical face section is substantially equal to the outer diameter of said one rod, and wherein the diameter of said cylindrical knob section is less than the inner diameter of the other of said rods by an amount slightly in excess of the eccentrical dispositions of said blind bore and said aperture as regards their respective longitudinal axes.

4,087,188

PIVOT JOINT HOUSING

Victor R. McEowen, 379 Pittsfield Dr., Worthington, Ohio 43085

Filed Mar. 3, 1976, Ser. No. 663,237
Int. Cl.[2] F16C *11/06*
U.S. Cl. 403—138 3 Claims



1. A housing for pivot joints comprising, in combination, a cup-shaped housing portion provided by a forged carbon steel blank including a cavity provided with an inner wall, one end of said inner wall including a decarbonized spherical bearing surface integrally formed with the forging of said housing and said decarbonized spherical bearing surface having a final machined finish to remove surface metal from which carbon was removed by working of the metal during forging and said final finish also being subsequently locally hardened by induction to provide an annular controlled zone of hardened metal from the interior of said forged blank for said spherical bearing surface, and said hardened zone being of predetermined thickness with the metal of said housing surrounding said zone being relatively unhardened as compared to said zone.

4,087,189

CORD FASTENER

Glenn H. Mackal, 82 Chestnut Ridge Rd., Saddle River, N.J. 07458

Division of Ser. No. 344,749, Mar. 26, 1973. This application Nov. 5, 1973, Ser. No. 412,880
Int. Cl.[2] F16G *11/00*
U.S. Cl. 403—216 3 Claims

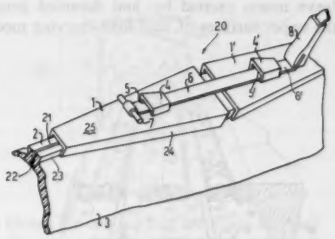
1. The combination comprising two runs of cord lying side-by-side and a fastener for retaining the runs from longitudinal slippage with respect to each other, the fastener comprising an elongated flattened sleeve embracing the two side-by-side runs of cord, the sleeve being bent into a longitudinally V-shaped zone intermediate its length, the sleeve being made of ductile metal and being transversely indented on its broad inner side at the apex of the V-shaped zone so as to deform and indent the two runs of cord engaged by such indentation.

4,087,190

CABLE SLEEVE WITH A CLAMPING RAIL

Wolfgang Haeder, Eichenau, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jun. 2, 1977, Ser. No. 802,713
Claims priority, application Germany, Jun. 28, 1976, 7620440
Int. Cl.[2] F16G *11/02*
U.S. Cl. 403—313 10 Claims



1. In a cable sleeve having a tubular member with a longitudinally extending slit with longitudinally extending flanges along each side thereof, said flanges having first surfaces facing each other and second surfaces facing away from the first surfaces and diverging away from the first surfaces so that each of said flanges has a tapering wedge-shaped configuration from each end thereof with the maximum thichness being adjacent the middle thereof, and a pair of clamping rails each having a pair of diverging legs interconnected by a bight portion, so that when the clamping rail is assembled on said flanges the legs engage the second surfaces to force the first surfaces of the flanges into sealing relationship to close the slit, the improvement comprising each of the clamping rails having a projection having an opening therethrough, and a tightening band extending through the openings to interconnect the two clamping rails, said tightening band being provided at one end with means for preventing passage of said one end through the opening of the projection of the one of the pair of rails and having means for fixing the other of the pair of clamping rails thereto so that during assembly of the clamping rails on said wedge-shaped flanges a tension force applied to the band forces the rails together into the assembled position and said means for fixing causes the tightening band to prevent accidental disassembly of the rails from the flanges.

4,087,191

LARGE MOTION EXPANSION JOINT

John F. Brady, Wood Dale, and Lawrence F. Pyle, Des Plaines, both of Ill., assignors to Felt Products Mfg. Co., Skokie, Ill.

Filed Jan. 31, 1977, Ser. No. 763,810
Int. Cl.[2] E01C *11/02*
U.S. Cl. 404—69 12 Claims

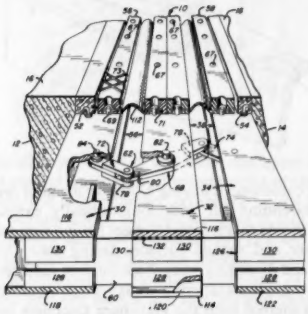
11. A large motion expansion joint for bridging a gap between edges of structural members forming a roadway comprising, in combination:

at least three elongate load-carrying modules spaced in parallel relationship to each other and aligned generally transversely to the direction of the roadway, each of said load-carrying modules having an upper surface, said load-carrying modules including a first end module mounted to an edge of one of the structural members, a second end module mounted to an edge of the other structural member, and at least one intermediate module spaced between said first and second end modules;

linkage control means operatively coupling the load-carrying modules, including at least two spaced sets of linkages between and interconnecting each adjacent pair of load-carrying modules for maintaining alignment and spacing of said modules in their parallel relationship in a direction generally transverse to the direction of the roadway and for proportionally maintaining generally equal spacing

between said modules during expansion and contraction of the gap, wherein each set of linkages includes links pivotally connected to each of the load-carrying modules, some of the links having bifurcated forked ends and some of the links having tongue-shaped blade-like ends with the bifurcated forked ends of the links on each module pivotally connected to the tongue-shaped blade-like ends of the links on adjoining modules;

aligned sleeve means carried by, and mounted generally below the upper surfaces of, said load-carrying modules; and



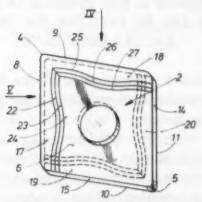
at least two spaced elongated support beams lying generally in the direction of the roadway for supporting the load-carrying modules; each said support beam being in fixed relationship within the said sleeve means associated with one of said end modules and being in slidable engagement within the said sleeve means associated with the other of said end and intermediate modules for accommodating sliding movement of said other end and said intermediate load-carrying modules in response to expansion and contraction of the gap.

4,087,192

CUTTING TOOL BIT

Karl Hertel, Oedenberger Strasse 29, 8500 Nuremberg, Germany

Filed Oct. 7, 1976, Ser. No. 730,521
Claims priority, application Germany, Oct. 8, 1975, 2544991
Int. Cl.[2] B26D *1/00*
U.S. Cl. 407—114 **24 Claims**



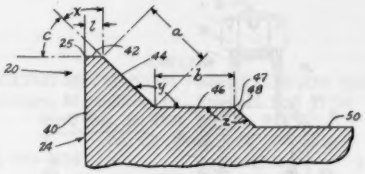
1. In a cutting tool bit having a center, end faces and side faces; at least one cutting edge formed by an abutment edge between an end face and a side face; a cutting face adjoining the cutting edge; and a plurality of chip breaker steps bounded by step edges and having a length dimension extending approximately parallel to the length dimension of the cutting edge and ascending from the cutting face towards the center; the improvement wherein the number of said chip breaker steps is more than two; said chip breaker steps being arranged in a terraced manner; and each said step edge having a wavy course of harmonic shape.

4,087,193

CUTTING TOOL WITH CHIP BREAKER

William L. Mundy, St. Louis, Mo., assignor to Allen J. Portnoy, St. Louis, Mo., a part interest

Filed Aug. 31, 1976, Ser. No. 719,285
Int. Cl.[2] B26D *1/12*
U.S. Cl. 407—114 **12 Claims**



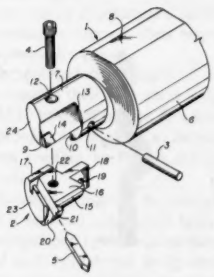
1. A cutting tool with chip breaker for the continuous machining of metal comprising a first top generally planar surface, an end surface, and a land surface, said first top and end surfaces being joined to and separated by said land surface, the cutting edge of said tool defined by the joinder of said land and end surfaces, the included angle between said first top and end surfaces being less than 55°, a second top generally planar surface extending at one end from said first top surface away from said cutting edge and forming an included angle with said first top surface of between about 125° and 145° measured outwardly of the tool body, said second top surface terminating at its other end in a second edge, the top of said tool, at the side of said second edge away from the cutting edge dropping below said second edge to allow a chip formed during machining to move from said cutting edge, over said first and second top surfaces, and relatively unobstructed past said second edge, the lengths of the first and second top surfaces being approximately equal and said second edge being below the cutting edge of the tool, the tool being made of a material that retains its cutting effectiveness at temperatures over 1200° F.

4,087,194

CUTTING TOOL

Victor C. Takacs, and Joseph E. Takacs, both of Houston, Tex., assignors to Triangle Grinding, Inc., Houston, Tex.

Filed Apr. 14, 1977, Ser. No. 787,333
Int. Cl.[2] B23B *51/00, 31/10;* B26D *1/12*
U.S. Cl. 408—199 **25 Claims**



1. A cutting tool comprising:

an elongated bar member; and

an anvil member removably fastened to one end of said bar member for rigidly clamping a cutting insert to said bar member for radial projection therefrom;

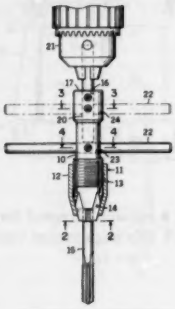
said one end of said bar member and said anvil member forming a cylindroid the elliptical cross section of which has a major axis substantially perpendicular to said radial projection of said cutting insert.

4,087,195

TAPPING ACCESSORY

James R. Wood, 3225 Central Ave., Columbus, Ind. 47201

Filed Mar. 7, 1977, Ser. No. 774,898
Int. Cl.[2] B25B *13/10, 13/44*
U.S. Cl. 408—240 3 Claims



2. A tapping accessory for use with the chuck of a rotary-operated machine, comprising:

(a) a body,

(b) a tap-connecting means on one end of the body,

(c) a tap tool detachably secured to the tap-connecting means,

(d) guide means including:

(1) a first guide element on the other end of the body, and

(2) a second guide element telescopically related and operatively mounted to the first guide element on a longitudinal axis, and adapted to be gripped in the chuck of the rotary-operated machine,

(e) a handle detachably secured to the body between the tap-connecting means and the guide means for turning the body and tap tool manually about the axis of the guide elements,

(f) the first guide element being a socket in the said other end of the body,

(g) the second guide element being a spindle slidably and rotatively received in the socket,

(h) the body being provided with a transverse bore at the bottom of and communicating with the socket, and

(i) the handle slidably extending through the bore and projecting laterally from opposite sides of the body, and the spindle engaging the handle in the socket to determine the relatively retracted position of the spindle in the socket.

4,087,196

APPARATUS FOR DERIVING ENERGY FROM MOVING GAS STREAMS

George John Kronmiller, 433 Millbrook Ave., Randolph, N.J. 07801

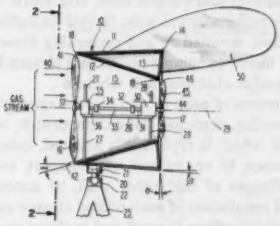
Continuation-in-part of Ser. No. 632,526, Nov. 17, 1975, abandoned. This application Oct. 27, 1976, Ser. No. 735,960
Int. Cl.[2] F03D *17/00*
U.S. Cl. 415—2 17 Claims

1. An apparatus for power generation adapted to be driven by a moving gas stream and comprising:

(a) A rigid housing including a common longitudinal axis and having a coaxial longitudinal frustoconical interior wall surface defining a central convergent conduit through said housing for at least a portion of the moving gas stream, said conduit having an inlet opening at the upstream end of said housing and an outlet opening at the downstream end of said housing;

(b) A turbine rotor mounted for free rotation about said common axis in a plane rearwardly adjacent the plane of said outlet opening of said conduit and in response to the flow of gas thereover;

(c) An induction fan mounted for driven rotation about said common axis substantially in the plane of said inlet opening of said conduit;



(d) Means for driving said induction fan; and

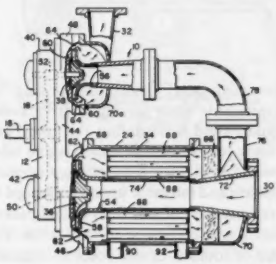
(e) Power transmission means connected to said turbine rotor for transmitting the mechanical energy generated by said turbine rotor during rotation.

4,087,197

GAS COMPRESSOR, AND FOR USE WITH A GAS COMPRESSOR: GEAR HOUSING AND GAS-HANDLING ASSEMBLY, AND HEAT EXCHANGING ASSEMBLY

Ronald L. Haugen, Mayfield, Ky., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Division of Ser. No. 581,218, May 27, 1975, Pat. No. 4,010,016. This application Sep. 7, 1976, Ser. No. 720,587
Int. Cl.[2] F04D *13/14, 25/16, 29/58*
U.S. Cl. 415—66 10 Claims



1. An improved gas compressor, comprising a gear housing; a driving gear and at least two driven gears enclosed within said housing; said driven gears being in engagement with said driving gear for rotation therewith on parallel, driven axes; said housing having parallel walls; a power input shaft, in penetration of one of said walls, drivingly coupled to said driving gear; at least two impellers for compressing gas, each impeller coupled to one of said driven gears externally of said housing; and means for admitting and discharging gas to and from said impellers; wherein the improvement comprises:

at least two, annular, spaced-apart flanges projecting externally from the other of said parallel walls;

said flanges each being concentric with, and circumscribing one of said impellers; and wherein

said gas admitting and discharging means comprises a first, domed closure assembly having means coupling said first closure assembly to one of said annular flanges, and a second, domed closure assembly having means coupling said second closure assembly to another of said annular flanges;

each of said closure assemblies comprising a first conduit for conducting gas therethrough to such impeller, of said at

least two impellers, which is associated therewith, and a generally cup-shaped, closure head;

said first conduit being in penetration of said closure head, having a terminal opening at one end thereof inside of said closure head, and a terminal opening at the other end thereof outside of said closure head, defining an annular chamber, inside of said closure head, concentric with said associated impeller's driven axis; further including

a second conduit, coupled to and projecting from each of said closure heads, opening through said closure head and onto said annular chamber; and wherein

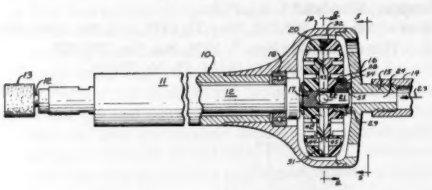
said coupling means of each of said closure assemblies comprises an annular, terminal flange, concentric with said first conduit, which is replaceably secured, externally of said compressor, to one of said spaced-apart, externally-projecting flanges of said other wall, to accommodate removal and installation of each of said closure assemblies independently of others thereof and without any further dismantling or assembly of said compressor.

4,087,198

SPEED GOVERNED ROTARY DEVICE

James V. Theis, Jr., Delray Beach, Fla., assignor to Hollymatic Corporation, Park Forest, Ill.

Filed Jan. 3, 1977, Ser. No. 756,250
Int. Cl.[2] F01D *1/18*
U.S. Cl. 415—82 **9 Claims**



1. A speed governed rotary device, comprising: a centrifugally radially expandable rotor having a drive surface acted upon by pressurized fluid for rotating the rotor and a fluid passage in said rotor to said surface including an inlet for said fluid; valve means in said rotor fluid passage openable under internal fluid pressure and movable upon centrifugal expansion of said rotor to restrict flow of said fluid in said passage to said surface upon centrifugal expansion of said rotor, thereby restricting the speed of rotation of said rotor to a maximum; and means for applying a prestress to said valve means for preselecting said maximum speed comprising an axle for said rotor at the axis of rotation of said rotor extending through one side of the rotor and a movable base member adjacent to said axis movable relative to said axle and engaging one side of said rotor.

4,087,199

CERAMIC TURBINE SHROUD ASSEMBLY

Martin C. Hemsworth; Robert J. Corsmeier, both of Cincinnati, and Ambrose A. Hauser, Wyoming, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Nov. 22, 1976, Ser. No. 743,616
Int. Cl.[2] F01D *11/08*
U.S. Cl. 415—174 **12 Claims**

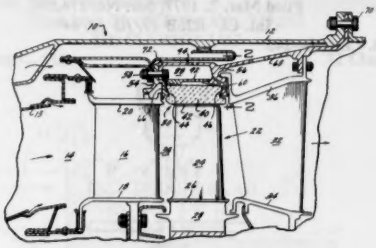
1. A turbine shroud assembly comprising

a ceramic block having an inner surface partially defining a generally annular hot gas passage and a pair of inclined dovetail surfaces disposed on opposite edges of the block;

rigid stop means upon which said ceramic block is seated;

a first annular support member bearing against a dovetail surface; and

a second annular support member having a flexible finger bearing against the opposite dovetail surface, said flexible



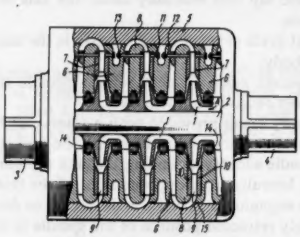
finger applying a radially directed force component for urging said block into engagement with said stop means.

4,087,200

STATOR OF MULTISTAGE CENTRIFUGAL COMPRESSOR

Izya Yakovlevich Korenblit, Moskovsky prospekt, 161, kv. 46; Arkady Fridmanovich Kaplansky, ulitsa Granitnaya, 36, kv. 67; Vladimir Viktorovich Arkhipov, Zanevsky prospekt, 28, kv. 205; Andrei Filippovich Frenkel, Michurinskaya ulitsa, 21/11, kv. 7, and Jury Pavlovich Sarychev, ulitsa Bukharestskaya, 27, korpus 3, kv. 134, all of Leningrad, U.S.S.R.

Filed Dec. 5, 1974, Ser. No. 529,950
Int. Cl.[2] F01D *1/02, 9/00;* F04D *29/40*
U.S. Cl. 415—199.2 **4 Claims**



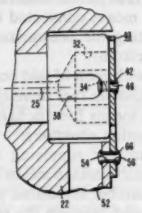
1. In a multistage centrifugal compressor, a stator comprising a series of stages coaxially arranged one after the other, with each stage including in the direction of flow of the fluid which is compressed an annular diaphragm, an annular vaned diffuser, and an annular return guide vane assembly, the latter being situated between the vaned diffuser of one stage and the diaphragm of the next stage and all of said diaphragms, vaned diffusers, and return guide vane assemblies surrounding a common axis, and said vaned diffuser with the return guide vane assembly of one stage forming with the diaphragm of the next stage a group of three components, said groups of three components being situated one after the other along said axis, and a single fastening means fastening together the components of each group, so that a vaned diffuser, followed by a return guide vane assembly and the latter followed by a diaphragm are all connected together by one fastening means, while the next group of three components are fastened together by a second fastening means, and so on, and an additional fastening means fastening each vaned diffuser to the diaphragm of the preceding group.

4,087,201

LOCKING DEVICE FOR A NOZZLE BLOCK AND A METHOD FOR INSTALLING IT

John J. Walsh, III, Newtown Square, and Mitchell S. Kaminski, Prospect Park, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 17, 1976, Ser. No. 742,738
Int. Cl.[2] F01D 9/02
U.S. Cl. 415—202 16 Claims



1. A steam turbine having a nozzle chamber in fluid communication with a rotor through a nozzle block, said nozzle block being secured to said nozzle chamber by a locking apparatus, said locking apparatus comprising:

a threaded fastener having a head end with a first opening extending into said head from said head end;

a base having a first hole with said threaded fastener disposed therein and an aperture;

a plate extending over said head end onto said base with said plate having a first port and a second port, said first port being in general alignment with said first opening and said second port being in general alignment with said aperture; and

a first fastener disposed in the generally-aligned first port and first opening and a second fastener disposed in the generally-aligned aperture and second port whereby relative motion between said threaded fastener and said base is prevented by affixing said threaded fastener to said base with said plate and fasteners.

4,087,202

VERTICAL AXIS WIND TURBINES

Peter James Musgrove, Reading, England, assignor to National Research Development Corporation, London, England

Filed Jul. 19, 1976, Ser. No. 706,696
Claims priority, application United Kingdom, Jul. 21, 1975, 30369/75
Int. Cl.[2] F03D 7/06
U.S. Cl. 416—41 16 Claims

1. A wind turbine comprising:

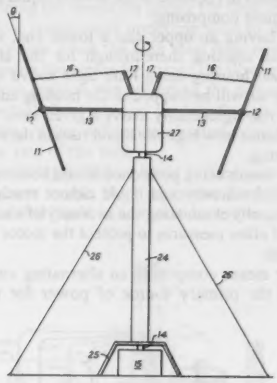
a support structure mounted for rotation about a vertical axis, said support structure comprising a central hub and radially extending arms;

a plurality of aerofoil section blades;

hinge means on each arm attaching one of said blades to said arm at a point dividing the length of the blade into major and minor portions;

a tension element connected to the major portion of each blade; and

a common bias means mounted on said central hub and coupled to each of said tension elements, whereby said bias means control the increase in the angle of inclination of the blades to the vertical as their major portions are acted on by centrifugal force and swing outwards about



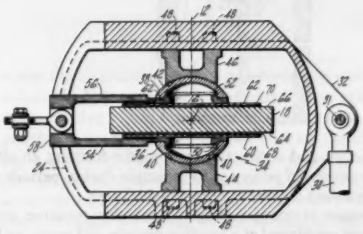
the hinge means, said increase in inclination reducing the rotational speed for a given wind speed.

4,087,203

CROSS BEAM ROTOR

Donald Leroy Ferris, Newtown, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jan. 7, 1977, Ser. No. 757,168
Int. Cl.[2] B64C 27/38
U.S. Cl. 416—141 5 Claims



1. A helicopter cross beam rotor having a pair of opposed blades supported by a common flexible spar for rotation about an axis of rotation, each blade shaped at its inner end to envelope the spar in spaced relation, the inner end of the blade having a pitch horn to receive control inputs, said blade inner end centered about said spar by a bearing assembly including first and second bearing surfaces to produce relative sliding motion between the spar and blade inner end upon blade pitch angle changes, blade lead-lag, and blade flapwise bending, wherein said first bearing surface is spherical and said second bearing surface is flat.

4,087,204

ENCLOSED SUMP PUMP

Karl O. Niedermeyer, 17W068 North St., Bensenville, Ill. 60106

Division of Ser. No. 534,468, Dec. 19, 1974, Pat. No. 3,999,890, which is a continuation-in-part of Ser. No. 460,423, Apr. 12, 1974, Pat. No. 3,941,507. This application Aug. 9, 1976, Ser. No. 712,546
Int. Cl.[2] F04B 41/06
U.S. Cl. 417—2 12 Claims

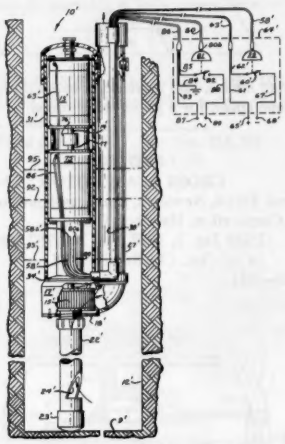
1. In a submersible sump pump apparatus comprising electric motor means, a vertically positioned shaft rotated by said motor means, an impeller secured to the lower end of the shaft, an enclosure about the impeller through which liquid is

pumped from the sump, and control means including a liquid level sensor device for controlling the starting and stopping of said motor means in response to the level of liquid in said sump, the improvement comprising:

a housing having an upper and a lower end, said housing having an opening therethrough for the entry of said liquid, said housing being fluid tight above said opening whereby air will be trapped in the housing and said liquid will not rise significantly above a given level in the housing no matter how high the liquid rises in the sump outside the housing;

said motor means being positioned in said housing above said given level whereby said liquid cannot reach said motor means thereby eliminating the necessity of a seal about the shaft and other measures to protect the motor means from the liquid;

said motor means comprising an alternating current motor forming the primary source of power for rotating the



impeller, and a direct current motor forming an alternative source of power as for example during periods when alternating current is not available; and

said sensor device including two pressure sensitive actuator means positioned at a location outside said sump, and fluid conduit means having an open end through which fluid can enter so that the fluid pressure in the conduit means corresponds to the fluid pressure at said open end, said conduit means having another end communicating with said actuator means so that the fluid pressure in said actuator means corresponds to the fluid pressure at said open end, said open end being within said housing, one of said actuator means initiating the energization of the alternating current motor when the liquid in said sump reaches a first level, the other of said actuator means initiating the energization of the direct current motor when the liquid in said pump reaches a second level, said second level being above said first level.

4,087,205

FREE-PISTON ENGINE-PUMP UNIT

Richard P. Heintz, 1841 Oakland Dr., Kalamazoo, Mich. 49008

Filed Aug. 1, 1975, Ser. No. 601,226

Int. Cl.[2] **F04B** *31/00, 35/00*

U.S. Cl. 417—11 **19 Claims**

1. A free-piston engine-pump unit, comprising in combination:

housing means defining therein first and second coaxially aligned and axially spaced bore means;

first and second piston means slidably disposed in said first and second bore means respectively, said first and second piston means being fixedly interconnected for simultaneous reciprocating movement;

each said piston means including a power piston coacting with the respective bore means to define a combustion chamber adjacent one end thereof, each said piston means also including a pumping piston fixed relative to the power piston and coacting with the respective bore means to define a pumping chamber adjacent the other end thereof;

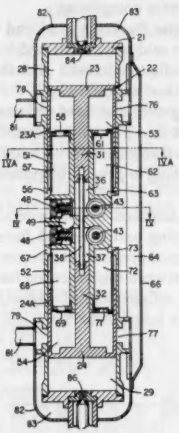
supply conduit means connected to said pumping chambers for supplying a low pressure working fluid thereto;

discharge conduit means connected to said pumping chambers for permitting the pressurized working fluid to be discharged therefrom;

means associated with each of said combustion chambers for supplying combustible fuel thereto;

discharge passage means for discharging the exhaust gases from the combustion chambers;

inlet passage means for supplying air to the combustion chambers, said inlet passage means including an intermediate air supply chamber associated with each of said power pistons and defined between the respective power piston and a portion of said housing means, each said intermediate chamber being disposed on the opposite axial side of the respective power piston from the respective combustion chamber;



said inlet passage means also including a first passage for supplying air into each said intermediate chamber and a second passage for discharge of air from each respective intermediate chamber for supply to said combustion chambers;

valve means associated with said inlet passage means for permitting air to flow through said first passage into the respective intermediate chamber during the compression stroke of the respective power piston and for permitting air to flow from said intermediate chamber into said second passage during the power stroke of the respective power piston;

said valve means including a first valve associated with each said intermediate chamber for permitting air flow through said first passage into the respective intermediate chamber solely when the respective power piston is moving on its compression stroke, and said valve means including a second valve associated with each said intermediate chamber for permitting discharge of air from the respective intermediate chamber into the second passage solely when the respective power piston is moving on its power stroke; and

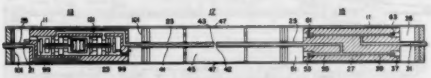
link means mechanically interconnecting said first valves together for causing simultaneous actuation thereof and

for causing closing of one of said first valves during opening of the other of said first valves, and vice versa.

4,087,206

SUBSURFACE PUMPING UNIT INCORPORATING HEAVY DUTY REVERSING VALVE AND METHOD OF OPERATING

Carl D. Russell, Sallisaw, Okla., assignor to Robert G. Brooks and Wretha M. Brooks, both of Tulsa, Okla.

Filed Jun. 3, 1976, Ser. No. 689,571
Int. Cl.[2] F04B *17/00*; F01L *21/04*
U.S. Cl. 417—53 **6 Claims**

5. The method of reversing the flow of pressure fluid for a power piston in a power cylinder comprising the steps of:

providing a movable valve means in the power piston to alternate exhaust and application of pressure fluid to opposite ends of the piston;

establishing a collapsible chamber for high pressure fluid within said valve;

driving the piston to the end of a stroke by applying high pressure fluid to one end thereof and exhausting low pressure fluid from the other end;

mechanically, at least partially, collapsing said chamber toward the end of said stroke while establishing a further chamber expanding in size complementary with said collapsing chamber;

expanding said collapsible chamber while exhausting said further chamber via passageways in stems of opposed reversing pistons to move said valve in a direction away from the further chamber whereupon the valve means reverves the fluid flow to said piston to apply the high pressure fluid to said other end and to exhaust low pressure fluid from said one end.

4,087,207

METHOD AND APPARATUS FOR GAS INDUCED PRODUCTION OF LIQUID FROM WELLS

Walter L. Chappell; John T. Cleveland, both of 2836 Delafield St., Houston, Tex. 77023, and John D. Watts, P.O. Box 79466, Houston, Tex. 77079

Filed Mar. 1, 1976, Ser. No. 662,503
Int. Cl.[2] F04F *1/20*
U.S. Cl. 417—54 **1 Claim**

1. A method of continuously producing gas and liquid from a well established within the well condition limitations comprising the steps of:

(a) positioning a two position mass flow controller in the production tubing string of said well at an optimum level above the producing formation to make most efficient use of the stored energy in the pressurized gas and liquid;

(b) forming a gas accumulation chamber upstream of the said controller;

(c) forming a liquid accumulation chamber in the tubing string above the controller;

(d) forming a flow restrictive opening in the controller passing all fluid that flows from said gas accumulation to said liquid accumulation through the opening;

(e) positioning a flow restrictor adjacent said opening;

(f) positioning means for continually urging said flow restrictor to said high flow position;

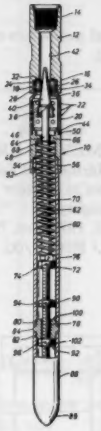
(g) positioning means for controlling movement of the flow restrictor relative to the opening;

(h) positioning and enabling the means for conrolling the flow restrictor to be directly related to the high mass flow rate and low mass flow rate of fluid flowing through the opening into the tubing string above the regulator such that the resulting daily mass flow rate at both the high flow condition and the low flow condition approximates the average predetermined optimum flow capability of the well;

(i) positioning the means for urging the flow restrictor to the high flow position and presetting same to shift to the low flow position when the high mass flow rate is exceeded;

(j) positioning the means for urging the flow restrictor to the high flow position and presetting the means for establishing the high flow rate and the low flow rate of fluid into the tubing string within the physical conditions and production rate of the well;

(k) accumulating sufficient liquid in the liquid accumulation chamber to enable the hydrostatic head formed by the accumulated liquid in cooperation with as pressure above



it and the restrictor means to overcome the well pressure below the low restrictor to cause said flow restrictor to move relative to said opening from the low mass flow rate position to the high mass flow rate position thereby allowing a relatively large volume of gas to move upwardly into the liquid accumulation chamber to thereby lift the accumulated liquid at a sufficient velocity to produce said liquid through the tubing to the surface of the well and thence to the flow line;

(l) exceeding the high mass flow rate wherein said means for urging said flow restrictor to said high flow position is overcome, thereby shifting said restrictor to the low flow position to enable liquid to accumulate once more in the liquid accumulation chamber in the tubing string.

4,087,208

METHOD FOR COMPRESSING MIXED GAS CONSISTING OF COMBUSTIBLE GAS AND AIR

Kazumi Uda, Fukuyama; Motohiko Tamura, Mihara; Ichiro Nishiura, Takehara, and Hiroshi Fujiike, Mihara, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

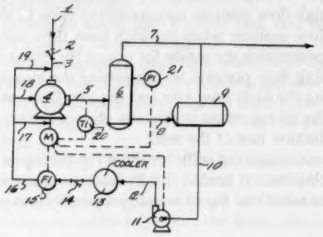
Filed Jun. 8, 1976, Ser. No. 693,975
Int. Cl.[2] F04C *19/00*
U.S. Cl. 417—54 **5 Claims**

1. A method for compressing mixed gas consisting of combustible gas and air, comprising:

injecting water into said mixed gas,

introducing said mixture of mixed gas and water into a water-sealed compressor,

injecting water into said water-sealed compressor, and



compressing said mixed gas/water mixture, whereby risk of explosion is reduced.

4,087,209

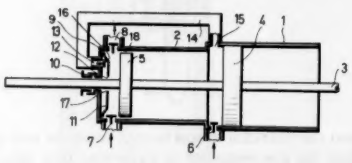
DISPLACEMENT SLURRY PUMP

László Máhig; Mihály Márton, and János Steiner, all of Budapest, Hungary, assignors to Aluterv Aluminiumipari Tervezo Vallalat, Budapest, Hungary

Filed Dec. 5, 1975, Ser. No. 637,849

Int. Cl.[2] F04B *3/00, 39/00*

U.S. Cl. 417—268 **4 Claims**



1. A displacement slurry pump comprising a cylinder having, in coaxial arrangement, a slurry section and an auxiliary liquid section with a diameter greater than that of said slurry section,

a reciprocating piston rod in said cylinder carrying a slurry piston in the slurry section with a diameter such that an aperture remains between the periphery of the piston and the wall of the slurry section, and an auxiliary liquid piston with a diameter providing a sealed fitting in the auxiliary liquid section of said cylinder, said slurry piston and said auxiliary liquid piston being separated on said piston rod by at least one stroke length,

said auxiliary liquid section being provided adjacent the slurry section with valved means for introducing auxiliary liquid at a pressure greater than the slurry inlet pressure,

said slurry section being closed at its end farthest from said auxiliary liquid section and provided adjacent said end with valved slurry inlet means and valved slurry outlet means,

said piston rod passing through packing gland means in said closed end of said slurry section,

flange means attached to the inner wall of said closed end of said slurry section, thereby forming an auxiliary liquid compartment in said slurry section, said flange means being provided with an aperture larger than the cross-section of said piston rod through which said piston rod passes relatively loosely, and

external valved duct means connecting said auxiliary liquid compartment with said auxiliary liquid section at a locus adjacent the slurry section.

4,087,210

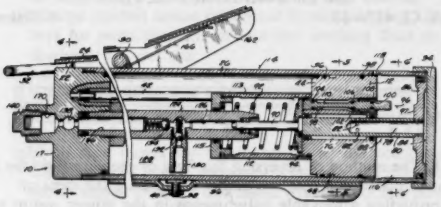
HYDRAULIC PUMPING DEVICE WITH PNEUMATIC ACTUATION

William G. Suechting, Okauchee Lake, Wis., assignor to Hein-Werner Corporation, Waukesha, Wis.

Division of Ser. No. 432,751, Jan. 11, 1974, Pat. No. 3,949,644. This application Jan. 28, 1976, Ser. No. 653,254

Int. Cl.[2] F04B *17/00, 35/00*

U.S. Cl. 417—401 **10 Claims**



1. An air operated hydraulic pumping device comprising:

a jacket member;

a cap member mounted at one end of said jacket member;

a hydraulic head member mounted at the opposite end of said jacket member;

an air head member mounted in said jacket member intermediate said cap and hydraulic members;

an air piston chamber in said jacket member between said cap member and said air head member;

an hydraulic fluid reservoir space in said jacket member between said hydraulic head member and said air head member;

an air piston means including a piston head and a piston rod fastened thereto mounted for reciprocal movement in power stroke and exhaust stroke directions in said air piston chamber, said piston rod being slidably mounted in said air head member;

air piston return means mounted in said jacket for moving said piston means in an exhaust stroke direction;

air pressure means including a conduit means connecting an air pressure source with said air head member;

air valve means mounted in said air head member for controlling the flow of air into and out of said air piston chamber to thereby control the reciprocal movement of said air piston means;

an hydraulic pumping means mounted in said reservoir space and operatively connected to said air piston means for actuation thereby;

said piston head of said air piston means having a power face facing said cap member and an exhaust face facing said air head member, said air valve means being operative to connect said piston power face with said air pressure source when said air piston means reaches the end of its exhaust stroke, said air valve means being further operative to cut off said piston power face from said air pressure source when said air piston means reaches the end of its power stroke and to connect the portion of said air piston chamber adjacent said piston power face with the portion of said air piston chamber adjacent said piston exhaust face during the exhaust stroke of said air piston means;

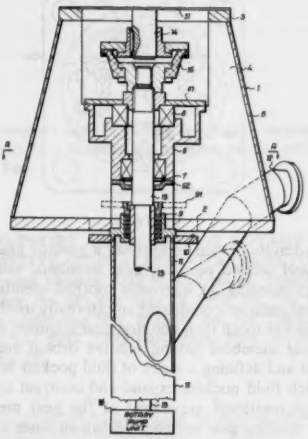
said jacket member including a vent means for venting the portion of said air piston chamber adjacent said exhaust face of said piston head as said air piston means reaches the end of its power stroke; and

a conduit means communicating air pressure from said air head member to said power face of said air piston.

4,087,211
DRIVING UNIT FOR VERTICAL PUMP

František Pochylý, Olomouc, Czechoslovakia, assignor to Sigma Lutin, narodni podnik, Lutin, Czechoslovakia

Filed Oct. 26, 1976, Ser. No. 735,393
Claims priority, application Czechoslovakia, Oct. 30, 1975, 7311/75
Int. Cl.² F04B 17/00
U.S. Cl. 417—424 6 Claims



1. A driving unit for a vertical shaft-driven pump for pumping liquids from deep wells and bore-holes, the pump having a rotary pumping unit disposed within a riser pipe and pumping liquid upwardly therethrough into a laterally extending branch pipe joined to the riser pipe adjacent the upper end of the latter, the driving unit comprising a supporting assembly having a cross-shaped base mounted on the top of the riser pipe, a radially disposed supporting rib extending upwardly from each arm of the base, a top flange for supporting a prime mover with a vertical shaft mounted on the upper ends of the ribs, a central bearing box having bearings receiving the upper end of the pump driving shaft within the upper end of the riser pipe, the bearing box being supported on the supporting assembly between the base and top flange thereof, a coupling drivingly connecting the shaft of the prime mover with the upper end of the pump driving shaft, and a stuffing box on the assembly forming a seal between the upper end of the riser pipe and the pump driving shaft, the branch pipe being disposed generally in a vertical plane radial of the riser pipe midway between two successive arms of the base of the assembly.

4,087,212
TRAVELING OIL PUMP VALVE

William D. Holder, 17022 Blackhawk Blvd., Friendswood, Tex. 77546

Filed May 4, 1976, Ser. No. 683,172
Int. Cl.² F04B 7/00, 21/04
U.S. Cl. 417—444 19 Claims

1. A traveling fluid pump valve mechanism for pumping of fluid from deep wells such as oil wells, said pump valve mechanism comprising:

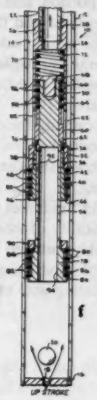
pump barrel means;

check valve means provided within said pump barrel means and allowing unidirectional flow of fluid medium into said pump barrel means;

first piston means located within said pump barrel means and being reciprocated by sucker rod means operatively connected to sucker rod actuating means, said first piston means having sealed engagement with said pump barrel means and cooperating with said pump barrel means and said check valve means to define a pumping chamber, said first piston means being formed to define first port means;

second piston means being movably supported by said first piston means and having second seal means provided thereon for establishing movable sealed relation with said pump barrel means, said second piston means being formed to define second port means;

piston valve seal means being interposed between said first and second piston means and being movable between an open position allowing fluid communication between said first and second port means and a closed position blocking



fluid communication between said first and second port means;

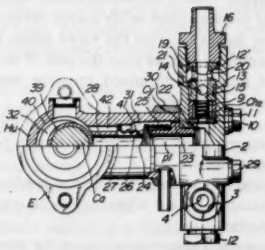
means urging said piston valve seal means toward said closed position thereof; and

said second piston means being movable relative to said first piston means, and in opposition to said means urging said piston valve seal means toward said closed position, responsive to the development of a predetermined pressure condition within said pumping chamber to cause opening movement of said piston valve seal means to place said first and second port means in fluid communicating registry.

4,087,213
SELF-ALIGNING RECIPROCATING PLUNGER PUMP

Shigeyuki Hadama, Atsugi, Japan, assignor to Atsugi Motor Parts, Co., Ltd., Atsugi, Japan

Filed Nov. 4, 1976, Ser. No. 738,956
Claims priority, application Japan, Jul. 21, 1976, 51-85926
Int. Cl.² F04B 21/02
U.S. Cl. 417—454 1 Claim



1. A combination of a reciprocating plunger pump and a water jet discharge device comprising:

a fluid inlet passage and a fluid outlet passage,

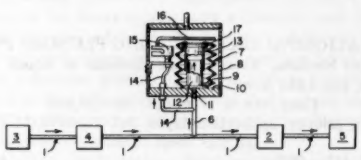
a main valve,
a control valve,
a jet pipe,
a plurality of cylinder-plunger-push rod-cam assemblies, each of said assemblies comprising
a push rod adapted to reciprocate in response to movement of a camming member,
a cylinder provided with an abutment and communicating with said inlet and outlet passages,
a plunger adapted to reciprocate in said cylinder and being provided at its lower end with a flange having an arcuately shaped base portion, and
a spring provided between said flange and said abutment on said cylinder for urging said arcuately shaped base portion of said flange against said push rod,
a first fluid passage coupling said fluid outlet passage to the input of said main valve,
a second fluid passage coupling the output of said main valve to an input of said control valve,
a third fluid passage coupling the output of said control valve to said jet pipe,
a casing for housing said fluid inlet passage, said fluid outlet passage, and said plurality of assemblies, and
a casing cover detachably fastened to said casing, said main valve and said control valve being attached to said casing cover and communicating with said first, second and third fluid passages.

4,087,214

MOTIVE FLUID SUPPLY SYSTEM FOR METERING VALVE

Jack Kushner, Lindenhurst, and Henry G. Zwirblis, Nesconset, both of N.Y., assignors to Delta Scientific Corporation, Lindenhurst, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,171
Int. Cl.² B67D 5/54
U.S. Cl. 417—557 **11 Claims**



1. An air supply system for continuously supplying air at a predetermined pressure from an air source periodically opened metering valve means wherein the valve means has a total air demand consumption greater than the rate of flow of air from the source at said predetermined pressure when the valve means is opened, comprising:

(a) a first conduit means for continuously supplying air at the predetermined pressure from the source of air directly said valve means;

(b) an expandable storage means for holding a predetermined quantity of air when expanded to an increased internal volume;

(c) second conduit means connecting the storage means to said first conduit means; and

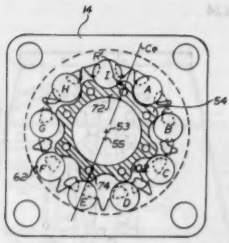
(d) actuating means for decreasing the internal volume of the storage means for forcing air therefrom to said valve means when the latter is opened.

4,087,215

GEROTOR GEARSET DEVICE

Laurence Lockhart Miller, West Lafayette, Ind., assignor to TRW Inc., Cleveland, Ohio

Filed Jul. 16, 1976, Ser. No. 706,131
Int. Cl.² F01C 1/02; F03C 3/00; F01C 5/04
U.S. Cl. 418—61 B **6 Claims**



1. A hydraulic device comprising a gerotor gearset including first and second meshing gear members, said first gear member comprising an internally toothed member and said second gear member comprising an externally toothed member having one less tooth than said first gear member, said first and second gear members having relative orbital and rotational movement and defining a series of fluid pockets between their teeth which fluid pockets expand and contract upon relative orbital and rotational movement of the gear members, said internally toothed gear member having an inner wall defining a series of circumferentially spaced arcuate recesses, the teeth of said internally toothed member comprising cylindrical vane members located in said recesses and which are circumferentially and radially shiftable in the recesses under the influence of forces acting thereon, each cylindrical vane member being circumferentially shiftable into sealing engagement with a first portion of the surface defining the recess in which the vane member is located and radially shiftable into sealing engagement with a tooth on the externally toothed gear member to seal the pressure in the expanding pockets from the pressure in the contracting pockets when the cylindrical vane member is located between the expanding and contracting pockets, the cylindrical vane member and another portion of the surface defining the recess defining a fluid passage which is in fluid communication with an expanding or contracting pocket and which directs fluid in the expanding or contracting pocket around at least a portion of the cylindrical vane member and to a location which is radially outward of the cylindrical vane member, said inner wall of said internally toothed member further defining a series of circumferentially spaced notches corresponding in number to the number of arcuate recesses and with one notch disposed between each pair of adjacent arcuate recesses, and said first portion of the surface defining each recess being resiliently deflectable due to the forces applied to said first portion by the respective cylindrical vane members during operation of the device to thus enable a fluid film to be maintained between each of said cylindrical vane members and said first portion of the surface defining the recess.

4,087,216

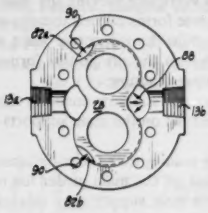
FLOW DIVERTER PRESSURE PLATE

Donald L. Shumate, Streetsboro, Ohio, assignor to Permco, Inc., Streetsboro, Ohio

Filed Oct. 5, 1976, Ser. No. 729,782
Int. Cl.² F04C 27/00, 29/00
U.S. Cl. 418—74 **7 Claims**

1. An end plate for a gear pump or the like comprising a discrete plate member including two circular portions defining a figure eight configuration, each of said circular portions having a hole therethrough, a recess in the same side of each circular portion of said plate member and being located on the

same side of a center line extending diametrically through said holes, and a channel in the outer peripheral edge of each circular portion of said plate member and spaced from the sides of



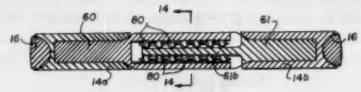
said plate member and extending from said recesses in said plate members to a terminating location on the other side of said center line.

4,087,217

VANE SUPPORT ASSEMBLY FOR ROTARY TYPE POSITIVE DISPLACEMENT APPARATUS

Albert Raymond Thomas, 7313 South Gessner, Houston, Tex.

Division of Ser. No. 581,956, May 28, 1975, Pat. No. 4,008,020.
This application Nov. 3, 1976, Ser. No. 738,614
Int. Cl.[2] F01C *1/00*; F03C *3/00*; F01C *21/00*
U.S. Cl. 418—258 **6 Claims**



1. In a rotary type apparatus of the type including a stator housing defined by a peripheral wall and end walls defining a central chamber therein, a rotor eccentrically mounted to rotate within said central chamber, vanes adapted to reciprocate within diametrically opposed, longitudinally and radially extending slots within the wall of said rotor, and a support assembly for structurally supporting and mounting diametrically opposed vanes within said rotor, the improvement wherein said support assembly comprises:

a. support rod means operatively coupling said diametrically opposed vanes, said support rod means including a pair of support rods rigidly coupled at respective opposed ends thereof to said opposed vanes, said pair of support rods having respective free end portions translatably coupled at a situs between said opposed ends, the free end portion of one of said pair of support rods having a cross-section defining a channel, the free end portion of the other support rod having a generally T-shaped cross section mateably received within said channel, and

b. roller bearing means disposed within said channel and coupling the free end portions of said pair of support rods at said situs.

4,087,218

ROTARY ENGINE

Paul F. Chapman, 1057 Martindale Ave., Hudson Falls, N.Y. 12839

Filed Dec. 3, 1976, Ser. No. 747,179
Int. Cl.[2] F01C *21/00, 1/00*
U.S. Cl. 418—259 **13 Claims**

1. A rotary engine driven by a pressurized fluid comprising:

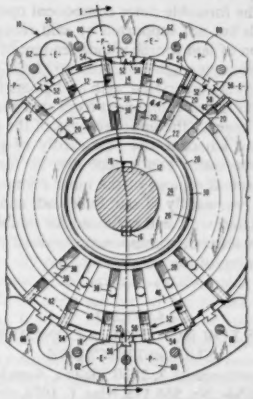
(a) a drive shaft;

(b) a rotor secured to said drive shaft, said rotor having a plurality of radial slots each containing a movable blade;

(c) a stationary cylinder concentrically positioned around said rotor and spaced therefrom, said stationary cylinder having a plurality of spaced chamber separators extending between said rotor and said stationary cylinder to form a plurality of pressure chambers, said blades extending into each said pressure chamber;

(d) pressure and exhaust ports formed in said stationary cylinder communicating with each said pressure chamber;

(e) a casing for connecting said pressure and exhaust ports with a supply of pressurized fluid and an exhaust outlet, respectively; and



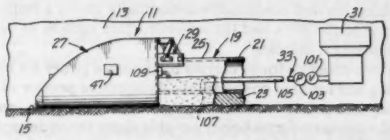
(f) a plurality of rotatable hump plates mounted in said casing adapted to engage a portion of each said blade to move said blades into and out of said pressure chambers as said hump plates rotate to clear the chamber separators and to be acted upon by the pressurized fluid to turn said drive shaft.

4,087,219

APPARATUS FOR INSTALLING UNDERGROUND PIPELINES

Thomas K. Breitfuss, 17541 Orange Tree La., Tustin, Calif. 92680

Filed Dec. 20, 1976, Ser. No. 752,143
Int. Cl.[2] E02D *15/04*
U.S. Cl. 425—59 **19 Claims**



1. An apparatus for forming underground pipelines of the type which include, at least during construction of the pipeline, a plurality of inner component sections at least partially enclosed by a formable outer component, said apparatus comprising:

a receptacle including means for supporting at least a portion of one of said inner component sections, said receptacle having an inlet opening sized to receive at least said one inner component section whereby at least said one inner component section can be inserted through said inlet opening and supported at least partially in said receptacle by said supporting means;

said receptacle including a bulkhead extending generally transversely adjacent one end of the receptacle, said bulkhead having an outlet opening of sufficient size to permit said one inner component section to pass rearwardly from the receptacle through the outlet opening;

means on said receptacle for at least assisting in relatively

axially advancing said receptacle and said inner component section whereby said one inner component section can be moved rearwardly relative to said receptacle and be closely adjacent an inner component section which was previously received by said receptacle and whereby said one inner component section can be moved rearwardly relative to said receptacle through the outlet opening to make room in the receptacle for at least another of the inner component sections;

a source of the formable outer component operatively associated with but not supported by said receptacle so that the location of said source is independent of said receptacle;

means operatively associated with said doors for delivering the formable outer component from said source firstly to a location beneath the upper regions of the inner component section adjacent and rearwardly of said bulkhead whereby the outer component can be formed at least partially around regions of the inner component sections which are rearwardly of said bulkhead; and

means associated with said bulkhead for inhibiting the flow of the formable outer component forwardly through said outlet opening of the bulkhead.

4,087,220

APPARATUS FOR BUILDING A CONCRETE BRIDGE SUPERSTRUCTURE

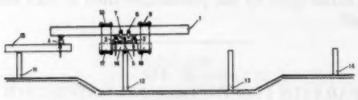
Kurt Koss, Sebastianplatz 7, 1030 Vienna, Austria

Continuation of Ser. No. 556,175, Mar. 6, 1975, abandoned. This application Oct. 1, 1976, Ser. No. 728,767

Claims priority, application Austria, Mar. 12, 1975, 2067/75

Int. Cl.[2] E01D *1/00*

U.S. Cl. 425—63 **7 Claims**



1. An apparatus for the sequential production of concrete sections of a superstructure spanning a plurality of piers spaced from each other in a longitudinal direction and supporting the superstructure sections, comprising

(a) an elongated main girder extending in the longitudinal direction and positionable sequentially above a respective one of the piers and the superstructure section to be supported on the pier;

(b) two concrete forms carried by the main girder for receiving and forming concrete into a respective portion of each superstructure section on either side of the pier, each of the concrete forms being movable along the main girder in the longitudinal direction to a respective side of the pier;

(c) support means for the main girder, the support means being arranged to support the main girder on previously formed concrete portions of the superstructure and comprising

(1) a rigid, stationary, auxiliary support in the center of the main girder intermediate a front and rear end thereof, the auxiliary support including two retractable support elements positioned on either side of the pier when the main girder is positioned above the pier,

(2) two main supports positionable rearwardly of the auxiliary support,

(3) a third main support positionable frontwardly of the auxiliary support, the main supports being movable along the girder in the longitudinal direction,

(4) the auxiliary support being arranged and dimensioned so that at least one of the main supports may be moved in the longitudinal direction past the auxiliary support;

(d) means on the main girder for selectively retracting respective ones of the main supports and for lowering respective ones of the main supports, the main supports being in thrust and stress force bearing connection with the main girder, selective retracting and lowering of the main supports vertically moving the main girder together with the concrete forms carried thereby and any concrete load therein while the respective main supports support the main girder on the previously formed concrete portions of the superstructure;

(e) means on the main supports enabling the supported main girder to be moved on the main supports in the longitudinal direction;

(f) means on the main girder for maintaining the main supports suspended on the main girder for movement therealong when the main supports are retracted, and

(g) the retractable auxiliary support elements being selectively operative to be lowered into supporting engagement with a previously formed concrete portion of the superstructure for supporting the main girder when the concrete forms carry no concrete load.

4,087,221

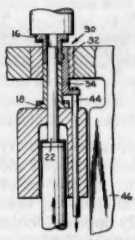
APPARATUS FOR MOLDING POWDER METAL PARTS

Harold C. Munson, Little Falls, and Ronald A. Sadlon, Mohawk, both of N.Y., assignors to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Jan. 31, 1977, Ser. No. 764,185

Int. Cl.[2] B30B *11/02*; B29C *3/00*

U.S. Cl. 425—78 **8 Claims**



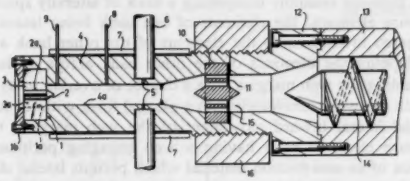
1. Molding apparatus for forming a powder metal article, said apparatus comprising an open-ended stationary die member having a side wall surface that extends in the direction of compression and acts as a partial cavity wall surface for the entire height of the loose powder to be pressed and which, after forming of the article, permits straight line ejection of the portion of the article formed by the stationary die wall surface, at least one die section mounted in said stationary die member, said die section being stationary during the pressing cycle but being slidably mounted in said die member during the article ejection cycle, said die section having a side wall surface that also extends in the direction of compression and which complements the stationary die wall surface to complete the cavity side wall surface, said movable die section wall surface having a constraining portion that abuts an adjacent, restrained portion of the compressed article to prevent movement of the article along the axis of pressure and relative to the die section when the die section is mounted in the stationary die member, said die section constraining portion being positioned ahead of said article restrained portion with reference to the end of the die means toward which the article is removed, means closing off the open ends of the die member and die section, said closing means comprising an upper and lower plunger means operable to move in the stationary die member and die section to define cavity end wall surfaces transverse to the axis of pressure and to compress said metal powder and form the article, and means for moving said die section and the article constrained thereby out of the stationary die member in a direction parallel to the axis of pressure to eject the article from the stationary die member.

4,087,222

CONTINUOUS EXTRUSION OF THERMOPLASTIC MATERIALS

Gérard Noel, Eupen, Belgium, assignor to Noel, Marquet & Cie, S.A., Eupen, Belgium

Filed Feb. 17, 1976, Ser. No. 658,462
Claims priority, application Germany, Feb. 25, 1975, 2507979
Int. Cl.[2] B29F *3/04*
U.S. Cl. 425—107 13 Claims



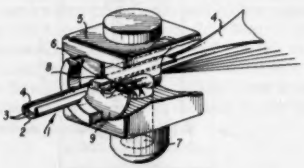
1. An extrusion die attachable to means for continuously extruding thermoplastic material having a preselected cross-section, the die comprising a nozzle through which the material is extruded to provide it with a desired cross-sectional profile, an elongate tubular nozzle holder having a wall defining an internal passage through which the material passes to the nozzle, and feed ducts upstream of said nozzle penetrating through said wall and opening into said passage through which a liquid medium can be applied to the surface of the material passing through the die, said wall having a roughened internal surface between said nozzle and said feed duct penetration.

4,087,223

EXTRUSION HEAD FOR THE MANUFACTURE OF HANDRAILS

Attilio Angioletti, and Aurelio Brollo, both of Milan, Italy, assignors to Industrie Pirelli S.p.A., Milan, Italy

Filed May 30, 1975, Ser. No. 582,364
Claims priority, application Italy, Jun. 5, 1974, 23603 A/74
Int. Cl.[2] B29F *3/10*
U.S. Cl. 425—112 2 Claims



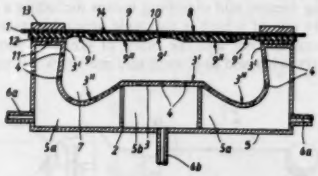
1. An extrusion head for the manufacture of a handrail comprising a die block having a die with an opening of C shaped form from which the handrail is originated, the opening comprising a curved section at each end thereof and a substantially straight section between the ends thereof, means operatively associated with said die for guiding a plurality of threads or cords to the die, a shaped cavity within said die block for the passage of plastic or elastomeric material from an inlet opening for the latter to the die where the body of the handrail is formed, a hollow space within said die block for feeding a band of fabric, intended to cover the concave surface of the handrail, into the shaped cavity, and two grooves in said shaped cavity to compel the plastic or elastomeric material to apply tension to the edges of said band of fabric in a direction perpendicular to the edges and parallel to the straight section of the opening before the band of fabric reaches the die whereby said band does not originate folds and adheres to the plastic or elastomeric material forming the body of the handrail.

4,087,224

INTEGRAL SKIN CUSHION MOLDING APPARATUS

Kurt Moser, Kirchheim, Germany, assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sep. 27, 1976, Ser. No. 726,765
Claims priority, application Germany, Sep. 24, 1976, 2542588
Int. Cl.[2] B29C *17/04*
U.S. Cl. 425—388 3 Claims



1. In apparatus for preshaping a stretchable sheet member to form substantially contour variation in its surface, said sheet member constituting for example a deformable sheet plastic or a fabric rendered impermeable to gas pressure by an elastic plastic coating thereon, said apparatus serving to reduce the amount of non-uniform stretch in localized areas of its surface due to said preshaping which would result from imparting the equivalent amount of contour variation using prior methods of manufacture, said apparatus including a mold box constituting a shaping die, a rigid internal molding surface in said box defining an open-faced die cavity having the ultimately desired contour configuration of said preshaped sheet member, means for temporarily clamping a sheet member across said open face of said die cavity and for sealing said member peripherally thereof, flow passages extending through said molding surface throughout its extent and communicating said die cavity to the back of said molding surface, and means in said mold box for communicating pressure through said flow passages to the underside of the sheet member when clamped across said die cavity, the improvement which comprises

means associated with said mold box for interconnecting the flow passages located in the more deeply contoured areas of said mold surface separately from those of the less deeply contoured areas whereby to provide at least two groups of interconnected flow passages; and

means for applying different pressures of different levels to the several groups of flow passages whereby to induce gas flow within the die cavity across the undersurface of said sheet member between adjacent areas thereof confronting differently contoured areas of said molding surface.

4,087,225

APPARATUS FOR FLARING PLASTIC TUBING

Glenn R. Wolcott, Dayton, Ohio, assignor to Papco Tool Corporation, Dayton, Ohio

Filed Nov. 22, 1976, Ser. No. 744,189
Int. Cl.[2] B29C *17/00*
U.S. Cl. 425—392 10 Claims

1. Apparatus for flaring the end of a length of cylindrical plastic tubing comprising:

a frame member;

a slide member movably mounted on said frame member for translational movement relative thereto;

means for moving said slide member;

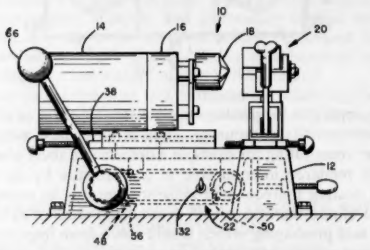
motor means mounted on said slide member for movement therewith;

speed reducing means mounted on said slide member in driven engagement with said motor means and having a power output shaft axially aligned with the direction of movement of said slide member;

flaring means in rotationally driven engagement with said power output shaft for axial rotation about a fixed axis aligned with the central axis of said cylindrical plastic

tubing and movable translationally along said axis upon movement of said slide member, said flaring means having a generally conical working face coaxially disposed with said axis and located on one end of said flaring means remote from an end thereof in engagement with said power output shaft;

means secured to said frame member for clamping a length of tubing to be flared in axial alignment with said axis of said flaring means with an unsupported end portion of the tubing projecting from said clamping means toward said flaring means, said clamping means including a pair of die blocks one of which is rotatable around a stationary central axis thereof and the other of which is movable into registry with said one, each said die block having a plural-



ity of mating semi-cylindrical dies formed in the outer peripheral edge portions thereof and selectably engagable in alignment with said axis of rotation of said flaring means so as to hold any of a plurality of predetermined sizes of plastic tubing in alignment with said flaring means, said clamping means further including cam locking means associated with said other die block for moving said other die block into and out of engagement with said one die block and for holding a pair of said mating dies in clamping engagement with said plastic tubing; and

means operable to move said slide member between a rearmost position in which said flaring means is disposable sufficiently remote from said clamping means that a tubing may be positioned in said clamping means and a foremost position in which flaring of said tubing can be completed.

4,087,226

STRETCHING WEBS OF SHEET MATERIAL

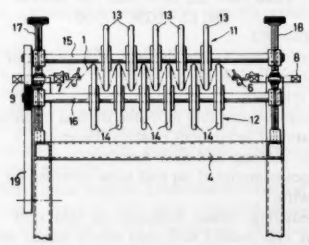
Frank Brian Mercer, Blackburn, England, assignor to F. B. Mercer Limited, England

Filed May 24, 1976, Ser. No. 689,127

Claims priority, application United Kingdom, May 23, 1975, 22649/75

Int. Cl.[2] B29C *17/02*

U.S. Cl. 425—397 **4 Claims**



1. Apparatus for transversely stretching a travelling web of flexible plastic sheet material comprising a pair of edge-restraining means for gripping the longitudinal margins of the web to prevent substantial lateral inward movement of the web margins, a pair of opposed pressure assemblies between which the web can travel whilst in the grip of the edge-restraining means so that the assemblies cause the web to take up an extended path from margin to margin by applying opposed forces respectively to the opposite surfaces of the web at alternate spaced locations across the width of the web so as to cause the web to stretch transversely, said edge restraining means gripping the longitudinal margin of the web prior to engagement of the web with said pressure assemblies and releasing the web subsequent to the engagement with the pressure assemblies, each pressure assembly comprising a bank of laterally spaced pressure elements, the elements of one bank being laterally staggered in relation to the elements of the other bank and overlapping the elements of the other bank across a plane containing the web margins with a degree of overlap so as to stretch the web transversely into a pleated form without substantial lateral inward movement of the web margins, the pressure elements each having a web engaging peripheral surface of an anti-friction material which permits lateral slippage between the web and said surface and drive means for continuously advancing the web longitudinally through and between said pressure assemblies, whereby said pressure assemblies continuously deform the web.

4,087,227

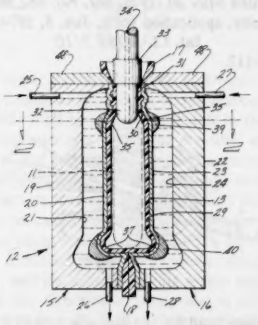
MOLD FOR THERMAL CONDITIONING A THERMOPLASTIC PARISON

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Dec. 6, 1976, Ser. No. 748,002

Int. Cl.[2] B29D *23/03*

U.S. Cl. 425—526 **11 Claims**

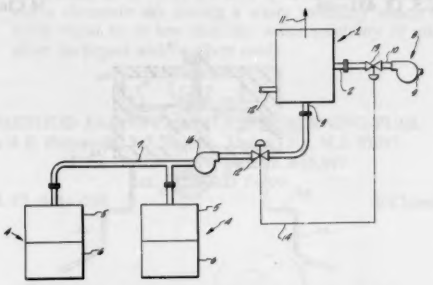


1. Apparatus for blow molding an article from a parison formed from a heated thermoplastic material comprising parison mold means for thermally conditioning such parison comprising at least one generally thin walled inner shell and at least one outer shell, means mounting said inner shell and said outer shell together for defining a mold fluid passage therebetween, said inner shell defining a cavity for receiving the parison, means for circulating a heat transfer fluid through said mold passage for heat transfer through said inner shell with the parison, and means varying the heat transfer rate between preselected different portions of the parison and such circulated heat transfer fluid whereby a predetermined non-uniform temperature profile is produced in the parison with a single circulated heat transfer fluid in said mold passage; a final blow mold; and means for transferring such thermally conditioned parison from said parison mold means to said final blow mold.

4,087,228
GASOLINE STATION EMISSIONS CONTROL

Angelo P. Datis, Los Angeles, Calif., assignor to Process Products, Inc., Gardena, Calif.

Filed Jul. 12, 1976, Ser. No. 704,242
Int. Cl.[2] F23G 7/06
U.S. Cl. 431—5 **2 Claims**



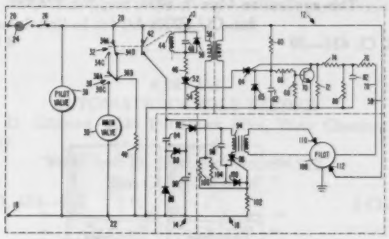
1. A gasoline dispensing station hydrocarbon vapor incineration device comprising:
- at least one hydrocarbon storage tank, said tank having a hydrocarbon liquid space and a hydrocarbon vapor space;
- an air compressor having an inlet and an outlet;
- an incinerator having an outlet, an air inlet and a hydrocarbon vapor inlet;
- a conduit connecting said hydrocarbon storage tank, hydrocarbon vapor space and said incinerator hydrocarbon vapor inlet;
- a conduit connecting said air compressor outlet and said incinerator air inlet;
- incinerator ignition means positioned adjacent said incinerator air inlet and hydrocarbon vapor inlet for burning said air and hydrocarbon vapor;
- hydrocarbon vapor flow control means located in said conduit connecting said pressurized tank hydrocarbon vapor space and said incinerator for stopping the flow of air and hydrocarbon vapor to said incinerator when the velocity of the hydrocarbon vapors falls below a predetermined level;
- hydrocarbon vapor blower means for purifying said hydrocarbon vapors located between said hydrocarbon storage tank and said hydrocarbon vapor flow control means; and
- air flow control means located in said conduit connecting said air compressor outlet and said incinerator for stopping the flow of air and hydrocarbon vapor to said incinerator when the air pressure at the inlet to said incinerator falls below a predetermined level.

4,087,229
AUTOMATIC FUEL IGNITION SYSTEM WITH REDUNDANT FLAME SENSING

Allen L. Teichert, Placentia, and William W. Chambers, Anaheim, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Jun. 28, 1976, Ser. No. 700,662
Int. Cl.[2] F23Q 9/08
U.S. Cl. 431—43 **20 Claims**

1. In an automatic fuel ignition system for a heating system having a main burner system a pilot burner, the combination comprising
- a pilot valve for supplying gas to the pilot burner,
- a main gas valve for supplying gas to the main burner,
- condition responsive means for actuating the pilot valve,
- spark generator means for igniting the pilot burner,
- a sensing electrode in the pilot burner flame,
- an electronic flame sensing circuit in circuit with said electrode and responsive to the increased conductivity of the pilot flame for sensing the presence of the pilot flame,
- switching means responsive to the flame sensing circuit to actuate the main gas valve in response thereto, and
- flame responsive switch means for sensing the heat of the pilot flame and connected in circuit with the switching

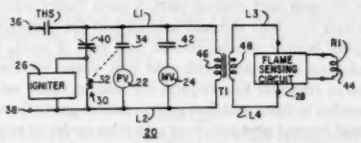


means and the main gas valve so that the main gas valve can be actuated only when the pilot flame is sensed by both the flame sensing circuit and the flame responsive switch means.

4,087,230
FUEL IGNITION SYSTEM PROVIDING FUEL SHUTOFF UNDER SIMULTANEOUS FAILURE CONDITIONS

Russell Byron Matthews, Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Filed May 10, 1976, Ser. No. 684,543
Int. Cl.[2] F23Q 9/08
U.S. Cl. 431—46 **23 Claims**



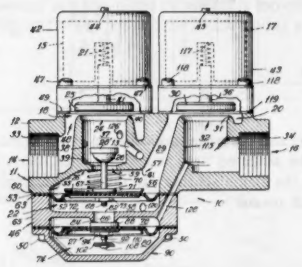
1. In a fuel ignition system including pilot valve means operable when energized to supply fuel to a pilot outlet for ignition by an ignition means to establish a pilot flame, main valve means operable when energized to supply fuel to a main burner apparatus for ignition by the pilot flame to provide heat, and flame sensing means responsive to the establishment of a pilot flame for energizing said main valve means, a control arrangement comprising heat sensor means operable when energized to provide an energizing path for at least one of said valve means, activate means reponsive to a request for heat to energize said heat sensor means and to effect the energization of said pilot valve means to supply fuel to said pilot outlet, said flame sensing means being responsive to the establishment of a pilot flame to effect the energization of said main valve means to supply fuel to said main burner apparatus, and to effect deenergization of said heat sensor means, said heat sensor means thereafter being maintained operated responsive to heat from said main burner apparatus to maintain the supply of fuel to said pilot outlet and said main burner apparatus, and being operable in the absence of heat from said main burner apparatus for a predetermined time to effect interruption of the supply of fuel to at least said main burner apparatus.

4,087,231

SLOW-OPENING GAS VALVE

Russell Byron Matthews, Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Division of Ser. No. 630,166, Nov. 10, 1975, Pat. No. 4,044,794.
This application Mar. 7, 1977, Ser. No. 774,955
Int. Cl.[2] F23N 5/24
U.S. Cl. 431—59 8 Claims



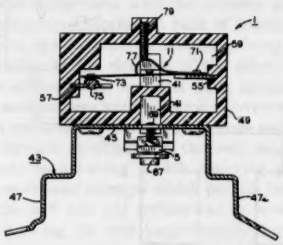
1. In a fuel heating system including a pilot burner and a main burner apparatus, a gas valve operable in response to a request for heat for supplying gas to said pilot burner and to said main gas burner apparatus comprising a housing including a main body portion having an inlet connected to a gas source and an outlet connected to said main gas burner apparatus, said main body portion having a central passageway interconnecting said inlet and said outlet, and having first and second ports formed therein between said inlet and said outlet of said gas valve, a first valve member disposed to normally close said first port and being movable to open said first port, a second valve member disposed to normally close said second port and being movable to open said second port, a pilot outlet interposed between said first port and said second port for supplying gas to said pilot burner whenever said first port is open, a first valve solenoid associated with said first valve member and energized in response to a request for heat to cause said first valve member to open and first port to enable gas to flow to an inlet of said second port and over said pilot outlet to said pilot burner for ignition to provide a pilot flame, and a second valve solenoid associated with said second valve member and energized in response to the ignition of gas supplied to said pilot burner to cause said second valve member to open said second port to enable gas supplied to said inlet of said second port to be supplied to said main burner apparatus over said outlet for ignition by said pilot flame, and regulator means interposed between said first port and said second port for regulating the flow rate from said first port to said inlet of said second port, said regulator means including regulator valve means having a regulating valve member, bias means causing said valve member to normally close a regulator port disposed within said central passageway between said pilot outlet and said second port, and actuator means responsive to gas flow through said first port when said first port is opened and said second port is closed to move said regulating valve member to open said regulator port to enable gas at a first pressure to be supplied through said regulator port to said inlet of said second port, and said actuator means being responsive to gas flow through said second port when said second port is opened to control the flow of gas through said regulator port from said first port to said inlet of said second port to increase the pressure of gas supplied to said outlet to a predetermined value.

4,087,232

METHOD OF ACTUATING MEANS FOR DETECTING RADIANT HEAT AND SYSTEM

Stanley J. Budlane, Fulton, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 463,299, Apr. 23, 1974, Pat. No. 3,968,469.
This application Apr. 2, 1976, Ser. No. 673,009
Int. Cl.[2] F23N 5/00
U.S. Cl. 431—66 24 Claims



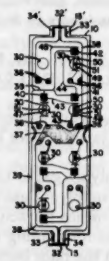
1. A system for operating apparatus utilizing a combustible gas comprising means for emitting radiant heat, means connected in circuit relation with said emitting means for supplying the combustible gas thereto to be ignited, and means for controlling the circuit relation of said emitting means so as to selectively effect energization of said emitting means and said supplying means, a pair of metallic strips each having a portion thereof respectively interconnected, means for pivotally mounting said strips spaced from said interconnected portions thereof and disposed with said strips so as to separate them, one of said strips being shielded at least in part with respect to the heat generated by said emitting means and said supplying means upon the energization thereof while the other of said strips is subjected to the heat so as to effect elongation of said other strip with respect to said one strip and pivotal movement of said interconnected portions of said strips generally about the pivotally mounting means, and means disposed between at least one of said one and other strips and said controlling means for driving it to a circuit controlling position respectively deenergizing said emitting means and energizing said supplying means so that the combustible gas from said supplying means is ignited by the remaining radiant heat of said emitting means.

4,087,233

RADIATION SWITCH FOR PHOTOFLASH UNIT

John W. Shaffer, Williamsport, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Oct. 18, 1976, Ser. No. 733,599
Int. Cl.[2] F21K 5/02
U.S. Cl. 431—95 A 8 Claims



1. A multilamp photoflash unit comprising, in combination, a pair of flashlamps,

an electrical circuit into which said lamps are arranged to fire individually and in sequence, and

a solid state radiation switch located external of the lamps and forming part of said electrical circuit, said switch being located adjacent one of said flashlamps to receive radiant energy emitted by that flashlamp, said photoflash unit being characterized by said switch being a high relative humidity and temperature resistant mass of material comprising silver carbonate and/or silver oxide, a binder and a chromate salt having a water solubility which is about equal to or less than the water solubility of said silver carbonate and/or silver oxide.

4,087,234

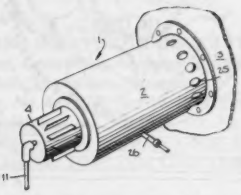
METHOD AND APPARATUS FOR BURNING FUEL

David S. Delyannis, 307 27th St., Union City, N.J. 07087

Filed Dec. 31, 1975, Ser. No. 645,897

Int. Cl.² F23D *11/04*

U.S. Cl. 431—168 **9 Claims**



1. An improved oil burner comprising the combination of:

a hollow combustion chamber having an inlet at one open end and an oulet at an opposite open end;

a squirrel cage impeller positioned within the chamber at the inlet for drawing air into one open end of said chamber and for causing the air to move through the chamber in a helical stream;

means for spraying the fuel oil into the stream of air adjacent to and inwardly of the impeller to form an air and fuel mixture including means for directing the fuel towards the interior walls of the chamber; and

means for igniting the fuel oil and air mixture for producing a flame which passes through said chamber and out the opposite open end in a helical path.

4,087,235

APPARATUS FOR INCINERATING WASTE GASES

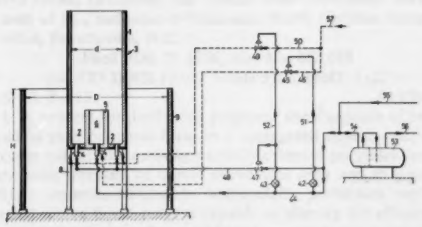
Takusen Ito, and Kenji Onose, both of Osaka, Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed Nov. 4, 1976, Ser. No. 738,927

Claims priority, application Japan, Apr. 9, 1976, 51-44874[U]

Int. Cl.² F23C *5/28*

U.S. Cl. 431—174 **9 Claims**



1. An apparatus for incinerating a waste gas comprising a combustion furnace main body having a peripheral wall and a hearth and a plurality of flare burners disposed on the hearth, each of the flare burners including a burner main body having a peripheral wall and a bottom wall, a waste gas main pipe provided under the burner main body, waste gas branch pipes extending upward from the waste gas main pipe and each having a vertical zigzag passage in an intermediate portion thereof, and gas nozzles mounted on the upper ends of the waste gas branch pipes respectively and positioned inside the peripheral wall of the burner main body.

4,087,236

AUTOMATIC CANDLE FEEDER

Chace D. Gilmore, 1224 Pottstown Pike, West Chester, Pa. 19380

Filed Jun. 17, 1976, Ser. No. 696,922

Int. Cl.² F23D *3/16*

U.S. Cl. 431—290 **5 Claims**

1. An automatic candle feeder comprising, in combination:

a base,

a plurality of symmetrically positioned upright support rods secured to said base,

a fixed top support ring mounted on said rods and adapted to engage the top peripheral portions of said candle,

a lower drive ring slideably mounted on said rods and adapted to support and urge said candle upwardly toward said top support ring,

a ring weight surrounding said rods,

plural guideways secured to said rods contiguous said top support ring, and flexible linkages slideably movable over said guideways linking said ring weight and said lower drive ring, thereby to urge said lower drive ring and hence said candle upwardly.

4,087,237

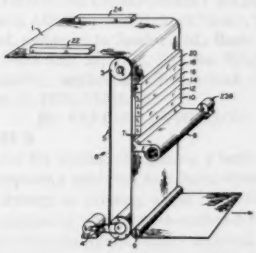
METHOD AND APPARATUS FOR HEATING AN ELONGATED ARTICLE

Russell E. Flick, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 10, 1976, Ser. No. 684,983

Int. Cl.² F27B *9/28*

U.S. Cl. 432—8 **17 Claims**



11. A method comprising:

actuating a first heating one, said heating zone being posi-

tioned adjacent a conveying zone for heating an elongated article conveyed in said conveying zone;

controlling the temperature of said first heating zone to a first temperature by regulating the amount of energy supplied to said first heating zone;

actuating the conveying zone after the passage of a first period of time; and

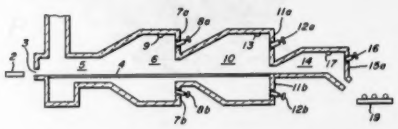
controlling the temperature of said first heating zone to a second temperature after the passage of a second period of time by regulating the amount of energy supplied to said first heating zone.

4,087,238

METHOD FOR ENHANCING THE HEATING EFFICIENCY OF CONTINUOUS SLAB REHEATING FURNACES

Lawrence G. Seigel, Franklin Township, Westmoreland County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Sep. 13, 1976, Ser. No. 722,835
Int. Cl.² F27B 9/12
U.S. Cl. 432—18 **7 Claims**



1. In the reheating of slabs to temperatures of about 1150° to 1320° C for further processing in a roll mill, wherein said slabs are elevated to such temperatures by passage through a continuous, co-current fired, pusher type, slab reheating furnace, comprising a preheat zone, a heat zone and a soak zone and heating means associated with each such zone, in which the soak zone is maintained at a median temperature approximately that of a desired exit slab temperature, and the heat zone is maintained at a temperature below that at which the surface of the slabs would melt to a significant extent, but at least that required to impart sufficient heat to achieve said desired exit slab temperature, and wherein the slabs on exiting said furnace are thereafter hot-rolled to semi-finished products,

the improvement for enhancing the heating efficiency of said furnace which comprises,

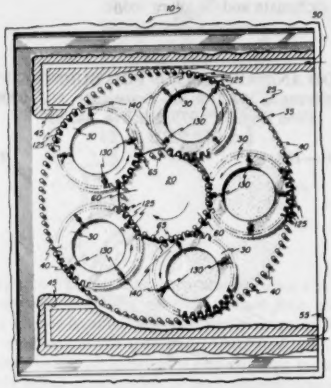
(a) maintaining said preheat zone at a median temperature, T_p, (i) at least that required to provide a heat-rate sufficient to achieve said desired exit slab temperature, but (ii) no greater than 90% of said soak zone median temperature, T_s; wherein T_p and T_s are measured in ° C.

4,087,239

APPARATUS FOR IMPARTING COMBINED CENTROSYMMETRIC AND NONCENTRO-SYMMETRIC ROTATION TO SEMICONDUCTOR BODIES

Harvey E. Cline, and Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 18, 1976, Ser. No. 733,239
Int. Cl.² F27B 9/14
U.S. Cl. 432—124 **29 Claims**



1. An apparatus for imparting combined centro-symmetric and noncentro-symmetric rotation to at least one body of semiconductor material during processing thereof by heating, said apparatus comprising:

a sun gear adapted to be rotatably driven;

a ring gear coaxial with and radially spaced outwardly from said sun gear;

at least one planet gear disposed between and in driven engagement with said sun and ring gears;

a base, said base being co-planar with said sun gear and providing a support for each of said planet gears;

the gear teeth of said ring gear comprising a multiplicity of first pins fixed to and upstanding from said base, said first pins being disposed in a circular arrangement around said sun gear, and

means for supporting a semiconductor body on each such planet gear, and restricting the conduction of heat from said semiconductor body to each such planet gear.

4,087,240

STABLE FORMULATIONS OF TEXTILE-PROCESSING AGENTS

Gerhard Reinert, Allschwil; Frank Lohmann, Arlesheim, and Paul Dussy, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 540,369, Jan. 13, 1975, abandoned. This application Jun. 15, 1976, Ser. No. 696,465

Claims priority, application Switzerland, Jan. 22, 1974, 865/74

Int. Cl.[2] D06L *3/12*

U.S. Cl. 8—1 W 7 Claims

1. A liquid, stable, textile-processing formulation, consisting essentially of

(a) 5 to 80% by weight of a colorless optical brightener,

(b) 15 to 90% by weight of a halogenated hydrocarbon solvent,

(c) 5 to 40% by weight of 2-methyl-2,4-pentanediol, and

(d) 0.3 to 8% by weight of a thickener selected from the group consisting of acetylcellulose, ethyl cellulose, and ammonium cellulose sulfate.

4,087,241

PRINTING INKS FOR TRANSFER PRINTING

Hubertus Psaar, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 468,673, May 10, 1974, Pat. No. 3,992,140. This application Jun. 14, 1976, Ser. No. 695,848

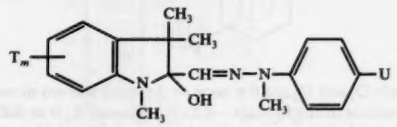
Claims priority, application Germany, May 18, 1973, 2325154

Int. Cl.[2] D06P *5/00;* C09D *11/00*

U.S. Cl. 8—2.5 A 1 Claim

1. Printing inks for the preparation of auxiliary carriers for transfer printing on acid-modified textile fiber materials, containing at least

(a) as a dyestuff intermediate, a carbinol base of cationic dyestuffs, which can be sublimed at 160°-240° C, of the formula



wherein

T is H, CH_3, OCH_3, NO_2, Cl, $COOCH_3$ or $COOC_2H_5$;

m is 1 or 2; and

U is C_1–C_4-alkyl, C_1–C_4-alkoxy or C_2–C_5-alkylcarbonylamino;

(b) a practically anhydrous neutral organic solvent; and

(c) a neutral resin which is soluble in this solvent.

4,087,242

PRODUCTION OF VARIEGATED POLYESTER YARN AND FABRIC

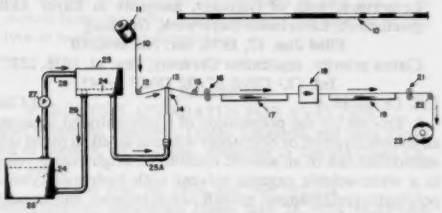
Floyd Frank, Levittown, and Aylmer John Woodward, Ambler, both of Pa., assignors to Monsanto North Carolina Incorporated, Fayetteville, N.C.

Filed Mar. 2, 1976, Ser. No. 663,028

Int. Cl.[2] D06B *11/00;* B05D *5/06;* D06P *5/22*

U.S. Cl. 8—15 12 Claims

1. A process for producing polyester yarn, capable of being dyed in yarn or fabric form to a variegated appearance, said process comprising running partially oriented polyester feeder yarn with freedom of lateral movement over and in contact with a smooth, stationary, horizontally positioned surface wetted with a liquid reagent capable of altering the affinity of the yarn to a disperse dye, said liquid reagent being supplied to said surface through an orifice in said surface, said orifice having a diameter of from about 0.1 to about 3 mm., the yarn running speed and the reagent flow rate being adjusted to prevent continued contact between yarn and reagent, whereby the yarn wipes the wetted surface to an intermittent and essentially dry state before the surface is again wetted by the reagent



and random contact between said feeder yarn and said reagent is obtained, and thereafter drawing or draw-texturing yarn.

4,087,243

POLYMER-PRINTED FABRIC AND METHOD FOR PRODUCING SAME

Manuel Andrew Thomas, and Jerry Albert Cogan, Jr., both of Spartanburg, S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Feb. 22, 1977, Ser. No. 770,880

Int. Cl.[2] D06M *15/52, 15/60;* D06P *5/22*

U.S. Cl. 8—31 18 Claims

1. A method for imparting a pattern to a textile fabric substrate which comprises:

applying to said substrate, in a pre-determined pattern, a non-aqueous admixture consisting essentially of at least 1 weight percent of an acid dyeable polymer having a cationic charge in milliequivalents/gram of polymer of from about 0.01 to about 5, said non-aqueous admixture having a viscosity of from about 5 to about 50,000 centipoise; drying the polymer-printed substrate; and, dyeing the dried polymer-printed substrate with a dye admixture containing an acid dyestuff preferential to the polymer coated portion of the substrate.

4,087,244

DYEING AND PRINTING BASIC DYEABLE TEXTILE SUBSTRATES WITH BECATIONIC DISAZO AND TRISAZO DYES HAVING OPTIONALLY FURTHER SUBSTITUTED 6-HYDROXY-4-METHYL-3-N-PYRIDINIUMPYRIDONE-2-COUPLING COMPONENT RADICALS

Manfred Greve, Allschwil, and Helmut Moser, Reinach, both of Switzerland, assignors to Sandoz Ltd., Basle, Switzerland

Filed Jun. 29, 1976, Ser. No. 700,934

Claims priority, application Switzerland, Jun. 30, 1975, 8466/75; Nov. 5, 1975, 14261/75

Int. Cl.[2] C09B *27/00, 29/36*

U.S. Cl. 8—41 R 18 Claims

1. A process for dyeing or printing a basic dyeable textile substrate comprising applying to a basic dyeable textile substrate, as a dyeing or printing agent, a bicationic disazo or trisazo dye containing 6-hydroxy-4-methyl-3-N-pyridinium or substituted pyridinium-pyrid-2-one-5 terminal coupling component radicals, the 1-position of each of which is independently unsubstituted or substituted, said dye being free of sulfo groups.

4,087,245

PROCESS FOR THE PREPARATION OF CONCENTRATED SOLUTIONS OF ANIONIC DYESTUFFS

Erich Kramer, Bergisch Gladbach, and Wolf Eckhard Bleck, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Filed Jun. 17, 1976, Ser. No. 696,910

Claims priority, application Germany, Jun. 21, 1975, 2527703

Int. Cl.[2] C09B *67/00*; D06P *1/645*

U.S. Cl. 8—85 A **3 Claims**

1. Process for the preparation of a concentrated solution of an anionic dyestuff or brightener wherein an alkali metal salt or ammonium salt of an anionic dyestuff or brightener is reacted in a water-soluble organic solvent with hydroxyalkylamine, polyhydroxyalkylamine, polyalkoxyalkylamine, and an acid or a salt of said amine with acid, and the resulting solution is separated from the precipitated alkali metal salt or ammonium salt.

4,087,246

FIBER MODIFICATION COMPOSITIONS AND PROCESS

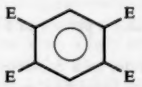
Frank Mares, Whippany, and Theodore Largman, Morristown, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Mar. 4, 1976, Ser. No. 663,957

Int. Cl.[2] D06M *13/20, 13/40*

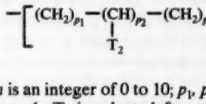
U.S. Cl. 8—115.5 **14 Claims**

1. A hydrophilic fiber additive comprising a member selected from the group consisting of compounds having the formula:

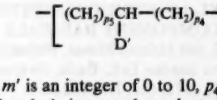


(A)

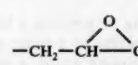
wherein two E groups are E_1, and two E groups are E_2, wherein E_1 are E_2 are the same or different and are selected from the group consisting of $—CON(R_1)_2$, $—CONH(CH_2)_r$ NCO and $—CO_2R_1$ wherein r is an integer of 1 to 5, and R_1 is a monovalent radical of the formula



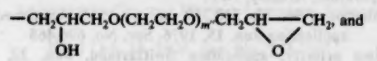
wherein m is an integer of 0 to 10; p_1, p_2 and p_3 are each integers and are 0 or 1, T_2 is selected from the group consisting of hydrogen, —OH, $—T_1$ and $—OT_1$, T_1 is in each occurrence independently selected from the group consisting of radicals of the formula



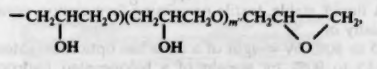
wherein m' is an integer of 0 to 10, p_4 and p_5 are each integers and are 0 or 1, A_1 is a member selected from the group consisting of hydrogen, alkyl radicals of 1 to 3 carbon atoms, an epoxide group of the formula



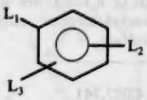
and an isocyanate group of the formula —NCO, and D' is selected from the group consisting of hydrogen, —OH, alkyl radicals of 1 to 3 carbon atoms and oxyalkyl radicals of 1 to 3 carbon atoms; with the provisos that (1) at least one E group must contain at least one —OH group; (2) at least one of E_1 and E_2 must contain at least one epoxide or isocyanate group; and (3) when E_1 and E_2 are the same, E_1 and E_2 must each be $—CO_2R_2$ wherein R_2 is a monovalent radical selected from the group consisting of (i) radicals of the formula



(ii) radicals of the formula

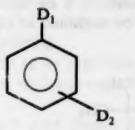


wherein m'' is an integer of from 3 to 8;



(B)

wherein L_1, L_2 and L_3 are independently selected from the group consisting of $—CON(R_1)_2$ and $—CO_2R_1$ wherein R_1 is as defined above, with the provisos that (1) at least one of L_1, L_2 and L_3 must contain at least one —OH group; (2) when L_1 and L_2 are not the same, at least one of L_1, L_2 and L_3 must comprise $—CO_2R_1$; (3) at least one of L_1, L_2 and L_3 must contain at least one epoxide or isocyanate group; and (4) when L_1, L_2 and L_3 are the same, they are each $—CO_2R_2$, wherein R_2 is as defined above;



(C)

wherein D_1 and D_2 are the same or different and are monovalent radicals of the formula $—CO_2R_1$, wherein R_1 is as defined above, with the provisos that (1) at least one of D_1 and D_2 contain at least one —OH group; (2) at least one of D_1 and D_2 must contain at least one epoxide or isocyanate radical; and (3) when D_1 and D_2 are the same, they are each $—CO_2R_2$, wherein R_2 is as defined above; and with the further provisos that (1) when T_2 is $—T_1$ or $—OT_1$, m' *for* T_2 cannot be greater than 4; (2) the sum of p_1, p_2 and p_3 must be at least 2; (3) the sum of p_4 and p_5 must be at least one; and (3) Σm_i must be at least 2; and mixtures thereof.

4,087,247

PROCESS FOR THE DYEING OF POLYACRYLONITRILE FIBERS

Manfred Petzold; Heinz Grunert, both of Dusseldorf, and Klaus Becker, Monheim, Baumberg, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dusseldorf, Germany

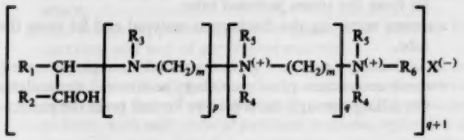
Filed Dec. 15, 1976, Ser. No. 750,726

Claims priority, application Germany, Dec. 15, 1975, 2556377

Int. Cl.[2] D06P *1/66, 3/76, 5/06*; C07C *87/30*

U.S. Cl. 8—169 **13 Claims**

1. In the dyeing of a fibrous material having a content of an anionic polyacrylonitrile fiber, wherein said material is contacted with an aqueous dye bath containing a cationic dye and said dye is substantively absorbed by said fiber, the improvement which comprises providing said bath with a content, as retardant for the dyeing and as levelling agent for said dye, of a water-soluble quaternary ammonium salt of the formula:



wherein

R_1 and R_2 each represent H or an alkyl radical of C_1–C_{20} chain length wherein the sum of the carbon atoms in R_1 and R_2 is an integer from 9 to 20,

R_3 represents H, an alkyl radical of C_1–C_5 chain length, a hydroxyalkyl radical of C_1–C_5 chain length, or benzyl,

R_4 represents an alkyl radical of C_1–C_5 chain length, or a hydroxyalkyl radical of C_1–C_5 chain length

R_5 represents an alkyl radical of C_1–C_5 chain length, a hydroxyalkyl radical of C_1–C_5 chain length, or benzyl,

R_6 represents benzyl,

m represents an integer from 2 to 6,

p and q represent integers from 0 to 4, wherein $p + q =$ an integer from 1 to 4, and

$X^{(-)}$ represents a salt forming counter-anion.

4,087,248

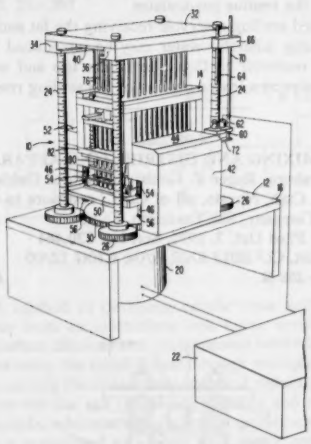
MULTIPLE ASSAY MACHINE AND METHOD

Laughton E. Miles, 1095 Vernier Pl., Stanford, Calif. 94305

Filed Jul. 26, 1976, Ser. No. 708,786

Int. Cl.[2] G01N *33/16, 23/10*

U.S. Cl. 23—230 B **31 Claims**



10. A method for carrying out a plurality of assay determinations in a plurality of samples, where the analyte to be determined is a member of one of two families which comprise a pair of specifically bindable substances and at least one sample contains a known amount of said analyte; employing for said assay determinations: an insolubilized member of one of said families; a detectant which provides a physically determinable signal in proportion to the number of detectant molecules present and is a member of one of said families; and a battery of syringes with plungers connected for synchronous movement and tips demountably mounted on the ends of said syringes for receiving solution and retaining said insolubilized member which comprises:

simultaneously drawing into each of said tips containing said insolubilized member a different one of said samples;

introducing detectant solution or any other reagent solutions and wash solutions into said tips from an outside source or from syringes by means for said syringes;

removing said solution from said tips by means of said tips; and

measuring by means of said physically determinable signal the amount of detectant insolubilized in said tips or removed from said tips, as a measure of the amount of analyte in each of said samples.

4,087,249

PYROLYSIS APPARATUS FOR ANALYSIS

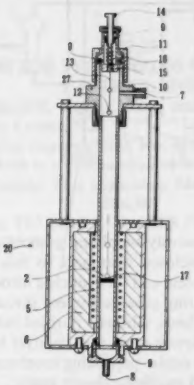
Tadaoki Okumoto, Inazawa; Tsugio Takeuchi, and Shin Tsuge, both of Nagoya, all of Japan, assignors to Toyoda Gosei Co., Ltd., Japan

Filed Dec. 20, 1976, Ser. No. 752,324

Claims priority, application Japan, Dec. 26, 1975, 51-157285; May 31, 1976, 51-63320; Dec. 26, 1975, 51-157286

Int. Cl.[2] G01N *31/12, 31/08, 25/24*

U.S. Cl. 23—253 PC **9 Claims**



1. A pyrolysis and analyzing apparatus comprising, a vertical tube, means for releasably suspending in said tube a sample of a material to be pyrolyzed and the decomposition gases thereof analyzed, means for introducing an inert carrier gas into said tube for transporting the decomposition gases to be analyzed, means defining a rest position within said tube through which said inert carrier gas can pass axially of said tube and to which said sample is dropped and held for heating until decomposed and gasified, means externally of said tube for heating said sample at said rest position, and means for said inert carrier gas transporting the gas to be analyzed can exit from said tube downstream of said rest position.

4,087,250

APPARATUS FOR REMOVING NITRIC OXIDES FROM PROCESSING EXHAUST GASES

Karl Heinrich Laue, Hattingen; Theo Sander, Essen; Peter Sauder, Essen, and Gotthard Uckert, Essen, all of Germany, assignors to Didier Engineering GmbH, Essen, Germany

Filed Mar. 19, 1976, Ser. No. 668,512

Claims priority, application Germany, Mar. 21, 1975, 2512410

Int. Cl.[2] B01J *8/04;* C01B *21/40*

U.S. Cl. 23—262 **7 Claims**

1. In an apparatus for removing residual nitric oxides from the exhaust gases of nitrogen-oxygen processing installations, particularly nitric acid production plants, of the type including a stage whereat said exhaust gases are maintained at an elevated pressure, said apparatus comprising:

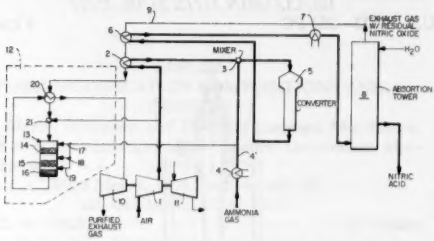
single pipe means for receiving all of said exhaust gases from said stage;

heat exchanger means connected to said single pipe means

for receiving all of said exhaust gases through said single pipe means from said stage and for heating said exhaust gases at said elevated pressure, said heat exchanger means being separate from said processing installation;

a catalytic reactor separate from said heat exchanger means positioned to receive all of said heated and pressurized exhaust gases from said heat exchanger means, said reactor comprising plural separate catalyst beds connected in series, each said catalyst bed having an inlet side and an outlet side, and each said catalyst bed having at said inlet side thereof an enclosed chamber;

means for passing all of said heated and pressurized exhaust gases from said heat exchanger means through the enclosed chamber of an upstream-most said catalyst bed, then through said upstream-most catalyst bed, and then serially through the remainder of the plural enclosed chambers and catalyst beds;



means for simultaneously supplying gaseous ammonia to all of said plural enclosed chambers to mix with the said exhaust gases therein and for reducing nitric oxides in said exhaust gases during passage thereof through the respective said catalyst beds, whereby purified exhaust gases exit from the downstream-most said catalyst bed, the reduction of said nitric oxides producing exothermic heat which further heats said purified exhaust gases;

means for passing said further heated purified exhaust gases from said downstream-most catalyst bed through said heat exchanger means, for transferring said exothermic heat to the nitric oxide-containing exhaust gases passing through said heat exchanger means from said stage, and for thereby cooling said purified exhaust gases; and

means for receiving the thus cooled purified exhaust gases from said heat exchanger means and for relieving the elevated pressure of said cooled purified exhaust gases.

4,087,251

FAT RECOVERY SYSTEM

James Cary Dobbs, Yakima, Wash., assignor to George H. Elliott Company, Chicago, Ill.

Filed May 17, 1976, Ser. No. 687,326
Int. Cl.² B01D *43/00;* C11B *1/16*
U.S. Cl. 23—280 **12 Claims**

1. A fat recovery system for hide fleshings and trimmings comprising, in combination,

a grinder for comminuting material of fleshings and trimmings to a pre-determined particulate size maximum,

a cooker having at least one steam jacketed tube with an interior screw conveyor,

means for transferring the comminuted material of particulate fleshings and trimmings from the grinder to the cooker,

said means comprising an inlet for introducing steam in the direction of flow to preheat and to assist in transferring said material from the grinder to the cooker,

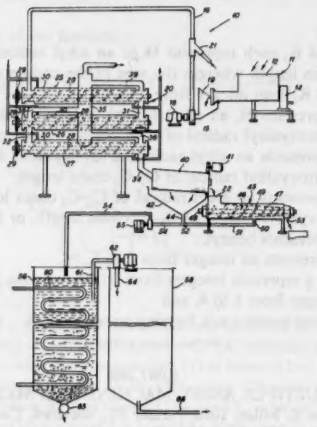
means for driving the screw conveyor to pass the material particulates through the steam jacketed tube while heating the same,

discharge means for the comminuted material and separated fat from the steam jacketed tube,

a screen receiving the discharged material and fat from the tube,

fat collecting means to receive fat passed through the screen,

a continuous screw press receiving the material particulates not falling through the screen to further press the particulates to further remove the fat into a common conduit with the fat discharged from the fat collecting means,



a discharge means at substantially the end of the press to remove the residue particulates

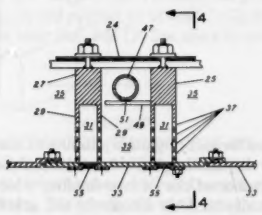
and a heated settling reservoir receiving the fat and residue particulates whereby water may be introduced into the settling reservoir to float the fat on top and wash the particulates to a lower portion of the settling reservoir.

4,087,252

FLUIDS MIXING AND DISTRIBUTING APPARATUS

David F. Strahorn; Roger F. Goldstein, both of Oakland, and Dennis R. Cash, Novato, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Oct. 7, 1976, Ser. No. 730,484
Int. Cl.² B01J *8/02, 8/04;* C10G *13/00*
U.S. Cl. 23—288 R **6 Claims**



1. Apparatus for mixing and distributing a liquid and a gas flowing in a generally vertical closed path through a bed of particulate material, comprising in combination:

a plurality of rigid beams disposed horizontally in generally parallel spaced relationship and extending longitudinally entirely across said path;

each beam including a downwardly open distribution space which extends upwardly and terminates short of an upper edge of said beam to form a rigid cross-member portion and a pair or rigid vertical partition portions extending vertically downwardly from said cross-member portion in

transversely spaced relationship on opposite sides of said space;

screen means supported on said cross-member portions for carrying said bed of particulate material;

horizontal partitions extending between lower ends of the vertical partition portions of adjacent beams to prevent the vertical flow of said liquid and gas past said beams, and to form, with said vertical partition portions, a plurality of upwardly open liquid accumulation spaces extending horizontally alongside each of said distribution spaces;

first passage means for conducting accumulated liquid from a lower portion of each accumulation space through at least one of the vertical partition portions and into the distribution space of an adjacent beam for downward distribution; and

second passage means above said first passage means for conducting accumulated gas from an upper portion of each accumulation space through at least one of the vertical partition portions and into the distribution space of an adjacent beam to be mixed with liquid in such distribution space and distributed downwardly therewith.

4,087,253

METHOD OF OBTAINING CAUSTIC SODA FROM A SODIUM CHLORIDE LIQUOR CONTAINING SULPHATE IONS RECOVERED FROM AN ELECTROLYTIC CELL

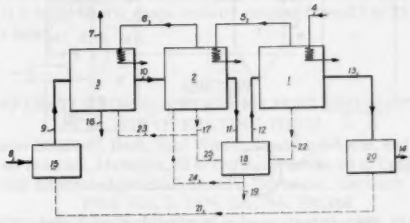
Guy Zabotto, Paris; Jean-Marie Guichard, Martigues, and Daniel Fournier, Paris, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Mar. 25, 1976, Ser. No. 670,417

Claims priority, application France, Mar. 28, 1975, 75 09799

Int. Cl. B01d *9/02;* **C01d** *1/04*

U.S. Cl. 23—297 **4 Claims**



1. A method of obtaining caustic soda and pure sodium chloride from an electrolytic cell liquor containing caustic soda, sodium chloride and contaminated with sulphate ions, by concentrating the initial liquor through multiple-effect evaporation, cooling the concentrate obtained, separating the sodium chloride and the salt containing sulphate and recovering the caustic soda, wherein during a first evaporation stage the initial liquor is evaporated to a point such that it precipitates only sodium chloride and not sodium sulphate, which sodium chloride is collected and separated from the remaining liquor; that in a second evaporation stage of the remaining liquor solid phases are sequentially formed, a first primarily sodium chloride phase which is removed, a second primarily sodium sulphate phase which is removed, and a triple salt phase of caustic soda, sodium chloride and sodium sulphate by evaporation of said remaining liquor, the triple salt solid phase being separated from the remaining liquor in said second stage; said triple salt solid phase being contacted apart from an evaporation stage in a third stage, with a caustic soda solution of a concentration below 35% by weight, which is said remaining liquor from said second stage to decompose the triple salt, that the sodium chloride containing sodium sulphate is separated from the remaining decomposition liquor; that in a fourth stage said separated remaining decomposition liquor from said third stage is subjected to further evaporation to produce a solid stage which is separated from said remaining liquor; said remaining liquor from said fourth stage is finally cooled so as to precipitate a solid phase of sodium chloride, sodium sulphate and triple salt of caustic soda, sodium chloride and sodium sulphate, that the said solid phase is separated from the caustic soda solution obtained, which does not crystallize and is removed from the system as a liquor, and the said solid phase is recycled to the initial liquor.

4,087,254

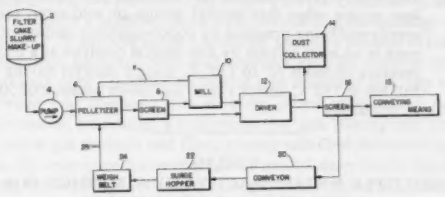
PROCESS FOR PELLETIZING WET SILICEOUS PARTICULATES

Robert B. Takewell, Borger, Tex., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation-in-part of Ser. No. 430,457, Jan. 3, 1974, abandoned, which is a continuation of Ser. No. 185,984, Oct. 4, 1971, abandoned. This application Mar. 7, 1975, Ser. No. 556,367

Int. Cl.[2] B01J *2/12;* **C01B** *33/12, 33/20*

U.S. Cl. 23—313 R **1 Claim**



1. In a process for agglomerating finely divided siliceous particulates selected from the group consisting of clay, silica, and silicates wherein said finely divided particlates of said clay, silica, and silicates are produced in an aqueous medium and are filtered and introduced into a pelletizer to form agglomerates thereof, the improvement comprising:

(a) producing finely divided particulates of clay, silica, and silicates in an aqueous medium;

(b) filtering said aqueous medium to form a filter cake of said siliceous particulates;

(c) preparing a slurry of said filter cake of said siliceous particulates, said slurry having a solids content in the range of from about 20 to 59% by weight solids;

(d) introducing said filter cake slurry of said siliceous particulates and recycled dried siliceous pelletized particulates thereof into a pelletizer in an amount so that the slurry of siliceous particulate material to be pelletized has a solids content by weight percentage in the range of from about 60 to 80%;

(e) pelletizing said slurry of said siliceous particulates;

(f) drying said formed pellets to a moisture content of about 3 to 5%;

(g) recycling at least a portion of the dried siliceous pellets produced by pelletizing said slurry to said pelletizer to form a portion of the particulate siliceous materials to be added to said filter cake slurry in said pelletizer; and

(h) recovering the remainder of the siliceous pellets.

4,087,255

COPOLYMERS OF ETHYLENE AND ETHYLENICALLY UNSATURATED MONOMERS, PROCESS FOR THEIR PREPARATION AND DISTILLATE OIL CONTAINING SAID COPOLYMERS

Max J. Wisotsky, Highland Park, and Norman Tunkel, Perth Amboy, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 158,632, Jun. 30, 1971, abandoned, which is a division of Ser. No. 808,040, Mar. 12, 1969, abandoned, which is a continuation-in-part of Ser. No. 717,902, Apr. 1, 1968, abandoned. This application Jan. 14, 1974, Ser. No. 432,947

Int. Cl.[2] C10L *1/18*

U.S. Cl. 44—62 8 Claims

1. A distillate petroleum fuel oil boiling in the range of 250° F. to 750° F. containing about 0.001 to 2 wt. % of a wax crystal modifier which has a number average molecular weight of about 1,000 to 50,000 and is a copolymer consisting of 3 to 40 molar proportions of ethylene and one molar proportion of ester of the general formula:

wherein:

(a) R_1 is selected from the group consisting of hydrogen and methyl radicals;

(b) R_2 is selected from the group consisting of —$OOCR_4$ and —$COOR_4$ groups;

(c) R_3 is hydrogen, and

(d) R_4 is a C_1 to C_4 alkyl group; which copolymer has less than 6 methyl terminating side branches per 100 methylene groups other than methyl groups on said ester, said copolymer being prepared by copolymerizing said monomers in an inert solvent by free radical catalysis at a temperature of about 70° to 130° C. using a catalyst having a half life at 130° C. under 1 hour and under pressure of 500 to 10,000 psi.

4,087,256

MULTIPLE METAL DEACTIVATORS, METHOD FOR PREPARING, AND USE THEREOF

Theodore C. Shields, Ashland, Ky., assignor to Ashland Oil, Inc., Ashland, Ky.

Division of Ser. No. 557,001, Mar. 10, 1975, Pat. No. 4,022,835. This application Jan. 12, 1977, Ser. No. 758,643

Int. Cl.[2] C10L *1/22*

U.S. Cl. 44—73 18 Claims

1. A method of preventing the oxidative degradation of a liquid hydrocarbon fuel and/or the copper-mercaptan gelation thereof comprising adding to said hydrocarbon fuel in a concentration of at least 0.003 ppm, by weight and excluding solvent carrier, a metal deactivator composition produced by:

(a) partially reacting in a liquid solvent at a temperature below about 200° C., an aliphatic polyamine selected from the group consisting of ethylenediamine, 1,2-propanediamine, 1,2-diaminocyclohexane, 2,3-diaminobutane, 1,3-propanediamine, 1,3-butanediamine, 2,4-pentanediamine, 1,6-hexanediamine, diethylenetriamine and mixtures of these, with a beta-diketone selected from the group consisting of 2,4-pentanedione, 2,2,6,6-tetramethyl-3,5-heptanedione, 2,6-dimethyl-3,5-heptanedione, 3,5-heptanedione, 2,4-hexanedione, 5-methyl-2,4-hexanedione and 5,5-dimethyl-2,4-hexanedione; and

(b) reacting the resulting reaction product in a liquid organic solvent completely with salicylaldehyde at a temperature below about 60° C., the mole ratio of said beta-diketone to said aliphatic polyamine of (a) being between about 0.6 to 1 and about 1.4 to 1, the mole ratio of said salicylaldehyde of (b) to said aliphatic polyamine of (a) being between about 1.4 to 1 and about 0.6 to 1, and the ratio of the total moles of said beta-diketone and said salicylaldehyde to the total moles of said ethylenedimine being about 2 to 1.

4,087,257

HIGH DENSITY-HIGH VOLUMETRIC HEATING VALUE LIQUID RAMJET

George W. Burdette, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 21, 1977, Ser. No. 779,657

Int. Cl.[2] C10L *1/04*

U.S. Cl. 44—80 2 Claims

1. A composition of matter consisting essentially of 80 ±1 weight percent hydrogenated norbornadiene dimer and 20 ±1 weight percent of a butylbenzene.

4,087,258

PROCESS FOR PURIFYING RAW GAS FROM THE GASIFICATION OF SOLID FUELS

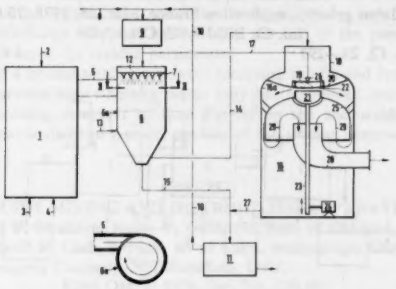
Gerhard Baron, Hofheim; Herbert Bierbach, and Carl Hafke, both of Frankfurt am Main, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 590,239, Jun. 25, 1975, abandoned. This application Mar. 9, 1977, Ser. No. 776,069

Claims priority, application Germany, Feb. 5, 1975, 2504657

Int. Cl.[2] C01K *1/06;* C01J *3/00;* B01D *53/34*

U.S. Cl. 48—197 R 8 Claims



1. In the production of a purified hydrogen and carbon monoxide-containing gas comprising the steps of treating a solid fuel at a pressure of 4 to 150 bars with a gasifying agent containing water vapor and oxygen to produce a raw gas containing hydrocarbons, sulfur compounds and dust in the amount of about 2 to 12 grams per standard cubic meter of dry gas and which is at a temperature of 400° to 700° C, the improvement which comprises spraying into the raw gas in a first scrubbing stage under a pressure of 4 to 150 bars highly dispersed scrubbing water at a temperature of 160° to 300° C thereby saturating the gas with water vapor, the scrubbing water containing less than 200 milligrams of solids per liter, 0.5 to 6 liters of scrubbing water being sprayed in per standard cubic meter of gas whereby the gas is cooled to a temperature of 0° to 20° C above the scrubbing water temperature, said first scrubbing stage being a cyclone scrubbing zone to which the raw gas is admitted tangentially to the inside surface of said zone, passing the gas into a second scrubbing stage at a pressure of 4 to 150 bars, spraying into said second stage in radial direction salt-free water with a temperature of 160° to 300° C containing less than 200 milligrams of solids in an amount of 0.1 to 0.3 liter per standard cubic meter of dry gas, removing from the second stage purified gas saturated with water vapor and containing 1 to 6 milligrams of solids per standard cubic meter, desulfurizing the gas after at least one of the first and second scrubbing stages and feeding the scrubbed and desulfurized gas into a power plant process.

4,087,259

PROCESS FOR PARTIALLY OXIDIZING HYDROCARBONS

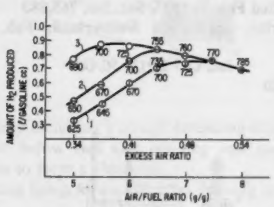
Yoshiyasu Fujitani, and Hideaki Muraki, both of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan

Division of Ser. No. 615,297, Sep. 22, 1975, abandoned. This application May 25, 1976, Ser. No. 689,907

Claims priority, application Japan, Sep. 20, 1974, 49-108974

Int. Cl.² C10G *11/28*; C01B *2/16*

U.S. Cl. 48—212 **3 Claims**



1. A process for partially oxidizing a hydrocarbon to hydrogen and carbon monoxide comprising: mixing a gas mixture of a hydrocarbon selected from the group consisting of naphtha, heavy oil, fuel oil, light oil, kerosene, gasoline and propane and an oxidizer selected from the group consisting of air, oxygen, a mixture of air and oxygen, a mixture of air and steam and a mixture of oxygen and steam, wherein the amount of said oxidizer employed based upon free oxygen as the oxidizing agent relative to said hydrocarbon is equivalent to the amount of air used in an excess air ratio ranging from 0.34 to 0.51 when air is used as said oxidizer; and reacting said gas mixture in the presence of a catalyst consisting essentially of from 0.005 wt.% to 1.0 wt.% rhodium supported on a carrier at 690° C to 900° C at a liquid hourly space velocity ranging from 0.5 to 25 liters per hour.

4,087,260

APPARATUS FOR SORPTION FILTERS AND METHOD FOR OPERATING THEM

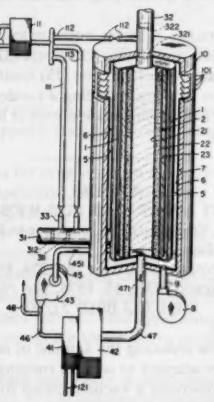
Dieter Strathoff, Bork; Karl Winter, Dortmund-Solde, and Gunter Staschik, Halingen, all of Germany, assignors to Ceagfilter und Entstaubungstechnik GmbH, Dortmund, Germany

Filed Nov. 3, 1976, Ser. No. 738,468

Claims priority, application Germany, Apr. 17, 1976, 2616999

Int. Cl.² B01D *53/04*

U.S. Cl. 55—28 **11 Claims**



1. Apparatus for the adsorption in sorption filters of vaporous or gaseous impurities from a stream of air or gas and for the desorption of the impurities by an inert gas after the filter is charged to a predetermined level, which comprises a sorption filter, a container surrounding said sorption filter, an outer jacket around said container, an annular gap between said container and said outer jacket through which coolant flows, an inlet conduit extending through said outer jacket, said gap and said container for the introduction of said stream of air or gas containing impurities for passage to one side of said filter permitting said air or gas to pass therethrough and charge said filter to a predetermined level, an outlet conduit extending through said container, said gap and said outer jacket for the discharge of said air or gas passing through said filter and leaving the side of the filter opposite the side of introduction of said air or gas, gas inlet closing means on the inlet side for introduction of said air or gas containing impurities, gas outlet closing means on the discharge side of said air or gas for blocking the flow of said air or gas, a combustion chamber outside said outer jacket for generating an inert gas, an inert gas inlet conduit extending through said outer jacket, said gap and said container for introducing said inert gas through said filter in a direction of flow opposite that of said air and gas to desorb said filter, an inert gas outlet conduit extending through said container, said gap and said outer jacket for the discharge of desorbate and inert gas, a coolant inlet extending through said outer jacket into said gap for the introduction of coolant flowing through said gap, and wherein the annular-gap cooler has at least three discharge openings in said outer jacket distributed substantially uniformly at the upper end of the container.

8. Method for the adsorption in sorption filters of vaporous or gaseous impurities from a stream of air or gas and for the desorption of the impurities by an inert gas after the filter is charged to a predetermined level, which comprises passing said air or gas containing impurities through a ring layer sorption filter surrounded by a container to purify said air or gas, continuing said passage of air or gas until the impurities in said filter reach a predetermined level, terminating said passage of said air or gas containing impurities, passing a coolant in indirect heat exchange with said sorption filter by flowing said coolant over the outer surface of said container in a gap between said container and an outer jacket surrounding said container, generating a cold protective gas, passing said protective gas through said filter, passing said cold protective gas in the interspace between a pair of spaced dampers for blocking the inlet flow of said air or gas to said filter, and to the interspace between another pair of spaced dampers for blocking the outlet flow of said purified air or gas from said filter, generating a hot inert gas, passing said hot inert gas through said filter to desorb said filter, and flowing said coolant through said gap to extract heat from said container during desorption and to maintain the container at a temperature below about 600° C.

4,087,261

MULTI-PHASE SEPARATOR

Lance G. Hays, La Crescenta, Calif., assignor to Biphase Engines, Inc., Santa Monica, Calif.

Filed Aug. 30, 1976, Ser. No. 718,950

Int. Cl.² B01D *1900*

U.S. Cl. 55—41 **2 Claims**

1. In the method of separating multiple phases in a pressurized flow, and employing a nozzle and a rotor having a rotating surface, the phases including liquid petroleum and a gaseous component, the steps that include

(a) passing the flow through the nozzle to expand the flow, causing the gaseous component to separate from the liquid petroleum,

(b) receiving a portion of the flow on the rotor causing the rotor to rotate and said liquid petroleum to form a rotating ring urged toward said surface,

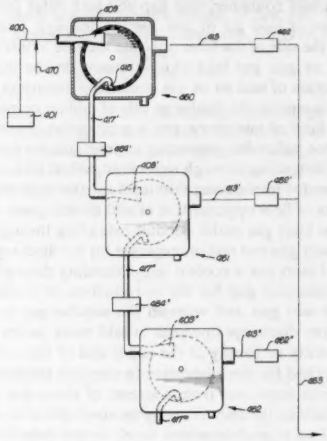
(c) scooping liquid petroleum from the rotating ring on the rotor during rotation of the ring and rotor, and

(d) confining the separated gaseous component in a zone

within which the rotor rotates and removing the gaseous component from said zone,

(e) there being a second nozzle and including the step of passing the removed liquid petroleum in the form of a second flow through said second nozzle to expand the second flow, causing a secondary gaseous component of the second flow to separate from the liquid petroleum,

(f) there being a second rotor, and including the step of receiving a portion of the second flow on the second rotor



causing the second rotor to rotate and said portion to form a second rotating ring urged toward a rotating surface of the second rotor,

(g) scooping liquid petroleum from the rotating second ring, for removal, and

(h) confining the separated secondary gaseous component in a secondary zone within which the second rotor rotates, and removing the secondary gaseous component from said zone.

4,087,262

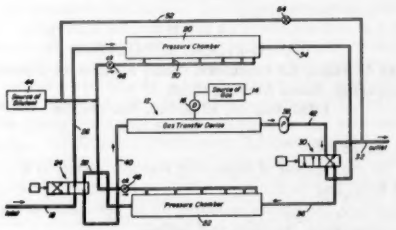
PRESSURIZED GAS TRANSFER SYSTEM WITH DILUTION CONTROL

Richard E. Speece, 2123 Reynolds St., Falls Church, Va. 22043

Filed Jun. 1, 1976, Ser. No. 691,762

Int. Cl.[2] B01D *19/00*

U.S. Cl. 55—52 **8 Claims**



1. In combination with the transfer of a relatively compressible fluid to a relatively incompressible fluent material by intermittent recirculation thereof between a transfer device and a collecting zone during which the fluent material is maintained pressurized at a relatively high level, followed by displacement of the fluent material with the compressible fluid absorbed therein from the collecting zone under a relatively low level pressure; the method of minimizing effervescence of the compressible fluid resulting from outflow of the fluent material from the collecting zone, including the steps of: supersaturating the fluent material with said compressible fluid during said recirculation; and supplying a liquid diluent to the fluent material after supersaturation thereof with the compressible fluid.

4,087,263

SEPARATOR SYSTEM FOR STEAM SUPPLIED APPARATUS

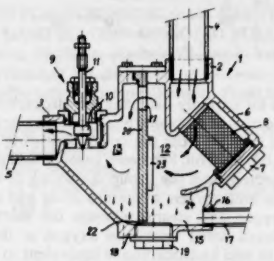
Fredi Schönmann, Jr., Zurich, Switzerland, assignor to E. Schonmann & Co., Ag., Zurich, Switzerland

Filed Feb. 7, 1977, Ser. No. 765,883

Claims priority, application Switzerland, Feb. 9, 1976, 1549/76

Int. Cl.[2] B01D *50/00*

U.S. Cl. 55—320 **10 Claims**



1. Control system for steam supplied apparatus, particularly to supply dry steam thereto from a supply comprising

a housing block (1) and defining therein a steam drying chamber (12, 13);

a steam inlet means (2) communicating with the interior of the housing;

a steam outlet means (3) communicating with the interior of the housing and providing for removal of dried steam therefrom;

a filter (8) removably located in the housing immediately behind the steam inlet means (2);

a control valve (9) removably located in the housing immediately in advance of the outlet means (3);

an impingement wall (20) subdividing the steam drying chamber into a pre-drying chamber (12) and a post-drying chamber (13), the pre-drying chamber being adjacent the filter (8) and the post-drying chamber being adjacent the valve (9);

means (21) forming a steam communication between the pre-drying and post-drying chambers (12, 13);

and a condensate collecting zone (15) located at the bottom portion of the housing including a condensate outlet duct (16) and in fluid communication with at least said pre-drying chamber.

4,087,264

METHOD AND APPARATUS FOR WEB TREATMENT

William J. Holm, Springfield, Vt., assignor to Riggs & Lombard, Inc., Lowell, Mass.

Division of Ser. No. 446,706, Feb. 28, 1974, Pat. No. 3,986,274. This application Oct. 15, 1976, Ser. No. 733,021

Int. Cl.[2] B01D *51/00*

U.S. Cl. 55—418 **2 Claims**

1. Apparatus for reducing the amount of mechanical mist in a closed chamber adapted to scour a running fabric web with a solvent and employing a vacuum pump for recovering said solvent, comprising

(a) a tubular conduit mounted horizontally in said chamber and connected to the discharge of said pump,

(b) said conduit being formed with a horizontal slot opening

along a side thereof and communicating with said chamber,

(c) an elongated trap including a shed baffle defining a channel mounted horizontally in close proximity to said opening and coextensive therewith to receive the discharge therefrom,

(d) said trap including a trough extending lengthwise of said conduit below said slot opening and spaced from the conduit to form a clearance,

(e) said trap being formed with an opening to said chamber, and,

(f) a quantity of metallic wool mounted in said trap in the path of the discharge and above said trough.

4,087,265

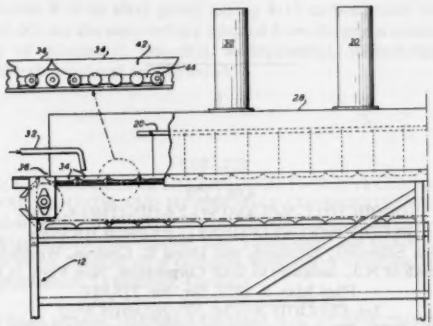
APPARATUS AND METHOD FOR CHILLING SEAFOOD PRODUCTS

Ernest J. Benson, Berkeley Heights, N.J., assignor to Benson Equipment Co., Inc., Berkely Heights, N.J.

Filed Nov. 19, 1976, Ser. No. 742,591

Int. Cl.[2] F25D *13/06*

U.S. Cl. 62—63 **6 Claims**



1. Apparatus for continuous processing a seafood product to rapidly chill said product; said apparatus comprising in combination:

container means for receiving said food product at the input end of said apparatus, and for receiving an aqueous bath for enveloping said products;

conveyor means for moving said container means from the input to output end of said apparatus;

means for depositing a frozen CO_2 cloud into said enveloping bath at said container means during movement of said container means through said apparatus, to form at said container means an ice-water slurry enveloping said food product; and

means for agitating said slurry in said container means during at least part of said movement through said apparatus, to promote uniformity in said enveloping bath, and to promote cooling contact between said food product and said enveloping slurry.

4,087,266

OPTICAL FIBRE MANUFACTURE

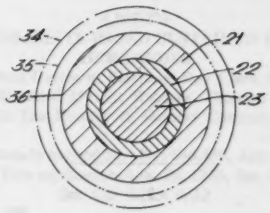
John Irven, Harlow, and Andrew Peter Harrison, Stansted, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Apr. 4, 1977, Ser. No. 784,204

Claims priority, application United Kingdom, Apr. 6, 1976, 13866/76

Int. Cl.[2] C03C *25/02*; **C03B** *37/04*

U.S. Cl. 65—2 **11 Claims**



1. A method of optical fiber preform manufacture for use in drawing an optical fiber having a predetermined ratio of core diameter to overall diameter including the steps of:

coating, by chemical vapor reaction, the bore of a silica substrate tube having a predetermined thickness with one or more core forming layers having a specified thickness to produce a structure which contitutes an optical waveguide preform when said bore has been collapsed having said specified thickness of core material and an excess thickness of said substrate material;

heating said coated tube and collapsing its bore; and

removing a predetermined amount of the outer surface portion of said structure by heating it to a temperature at which said predetermined amount of said substrate material is lost by volatilization, thereby increasing the ratio of said vapor reaction deposited core forming material to said substrate material in said fiber preform.

4,087,267

CONTROLS FOR USE IN FIBERIZATION SYSTEMS EMBODYING MEANS FOR SUPPRESSION OF POLLUTION

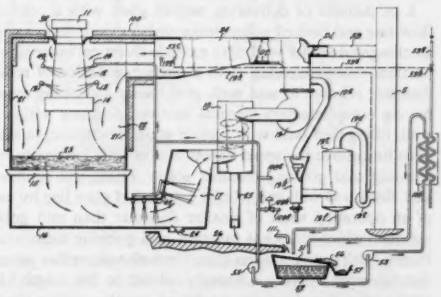
Rene Goutte, Tokyo, Japan; Jean A. Battigelli, Rantigny, and Marie-Pierre Barthe, Clermont, both of France, assignors to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed Dec. 30, 1976, Ser. No. 747,397

Claims priority, application France, Oct. 22, 1976, 76 31860

Int. Cl.[2] C03B *37/04*

U.S. Cl. 65—5 **9 Claims**



1. A process for manufacture of fibers comprising forming fibers by gas blast attenuation of attenuable material, establishing a current of the attenuating gas and the attenuated fibers in a forming section having a foraminous fiber collecting device

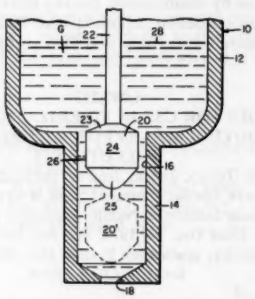
at a boundary of the forming section through which the gas of said current passes and on which the fibers collect to form a blanket, subjecting the gas to forced recirculation through a recirculation path extended from the downstream side of the collection device to the forming section, diverting and discharging a portion of the gas from said recirculation path, the discharge being effected by forced gas discharge, replenishing the current by adding new attenuating gas, and regulating the pressure in the forming section by sensing the gas pressure and by varying the force of discharge from the recirculation system in accordance with the sensed pressure.

4,087,268

METHOD OF DELIVERING MOLTEN GLASS

William P. Lentz, Addison, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Apr. 18, 1977, Ser. No. 788,615
Int. Cl.² C03B 5/26
U.S. Cl. 65—129 **5 Claims**



1. A method of delivering molten glass with a controlled flow rate and desired gob volume which comprises, providing an elongated feeder well with extended vertical inner sidewall portions communicating with a discharge orifice of reduced diameter relative to said well, positioning a gobbing member having complimentary vertical sidewall portions within said well, filling said well with molten glass, maintaining a molten glass line above the upper extent of said well, vertically reciprocating said gobbing member solely within the confines of said elongated well and wholly below said glass line by means of an operating shaft of smaller diameter than said gobbing member which does not function as a gobbing member, and thereby delivering molten glass through said orifice whereby the delivered volume is linearly related to the length of the stroke of said reciprocating gobbing member within the confines of said well and the rate of molten glass flowing through said orifice is linearly related to the speed of movement of said gobbing member wholly within the confines of said elongated well.

4,087,269

HERBICIDAL TRIAZOLE CARBOXAMIDES

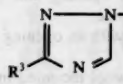
Robert Frederick Brookes, Tollerton; David Henry Godson, Chilwell; Douglas Greenwood; Margaret Tulley, both of Nottingham, and Stanley Brice Wakerley, Burton Joyce, all of England, assignors to The Boots Company Limited, Nottingham, United Kingdom

Division of Ser. No. 317,453, Dec. 21, 1972, Pat. No. 3,952,001, which is a continuation-in-part of Ser. No. 261,206, Jun. 9, 1972, abandoned, which is a continuation-in-part of Ser. No. 153,446, Jun. 15, 1971, abandoned. This application Aug. 11, 1975, Ser. No. 603,572

Claims priority, application United Kingdom, Jul. 1, 1970, 31922/70; Mar. 31, 1971, 8275/71; Dec. 31, 1971, 61022/71; Dec. 31, 1971, 61023/71

Int. Cl.² A01N 9/12, 9/14, 9/16
U.S. Cl. 71—92 **11 Claims**

1. A herbicidal composition which comprises a carrier and a herbicidally effective amount of a compound of the formula



in which R^3 is selected from the group consisting of alkylthio containing 2–5 carbon atoms, alkylsulphinyl containing 3–5 carbon atoms, alkylsulphonyl containing 1–5 carbons atoms and alkenylthio containing 3–4 carbon atoms, R^1 is selected from the group consisting of alkyl containing 2–6 carbon atoms, allyl and 2-methylallyl and R^2, which together with R^1 contains a total of 4–9 carbon atoms, is selected from the group consisting of alkyl containing 2–3 carbon atoms, allyl, 2-methylallyl and prop-2-ynyl.

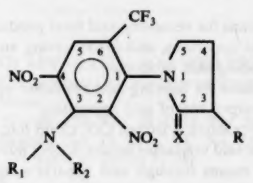
4,087,270

HERBICIDAL-N-(3-AMINO-2,4-DINITRO-6-TRIFLUOROMETHYLPHENYL)-PYRROLIDONES

Louis Schneider, Elizabeth, and David E. Graham, Westfield, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Mar. 3, 1977, Ser. No. 773,817
Int. Cl.² C07D 207/24, 207/26; A01N 9/22
U.S. Cl. 71—95 **14 Claims**

1. N-(3-amino-2,4-dinitro-6-trifluoromethylphenyl)pyrrolidones having the formula:

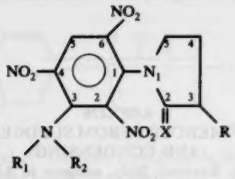


where

X is oxygen or sulfur, and R, R_1 and R_2 are selected from among H or lower alkyl, of up to 4 carbon atoms.

14. A herbicidal composition of matter comprising:

(a) a herbicidally effective amount of a 2,4-dihalo3,5-dinitrobenzotrifluoride having the formula:



where

X is oxygen or sulfur, and R, R_1 and R_2 are selected from among H or lower alkyl, of up to 4 carbon atoms, and, (b) an inert carrier.

4,087,271

1,2-BIS (THIOALKYL) ALKANES AND DERIVATIVES THEREOF AS ABSCISSION AGENTS

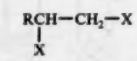
Tom Conrad Rheinecker, Green Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 676,762, Apr. 14, 1976, abandoned. This application Jul. 30, 1976, Ser. No. 710,353

Int. Cl.² A01N *9/14*

U.S. Cl. 71—98 **9 Claims**

1. A method of inducing fruit abscission comprising applying to fruit bearing plants an effective amount of agent having the structural formula



wherein R is an alkyl group having 8–10 carbon atoms and both X's are the same and are selected from the group consisting of thiomethyl, thioethyl, sulfinylmethyl, sulfinylethyl, sulfonylmethyl and sulfonylethyl.

4,087,272

4-(3-TRIFLUOROMETHYLPHENOXY)-PHENYLUREA COMPOUNDS AND HERBICIDAL COMPOSITIONS

Lothar Rohe, Wuppertal; Jürgen Schramm, Dormagen; Erich Klauke, Odenthal; Ludwig Eue, Leverkusen, and Robert R. Schmidt, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

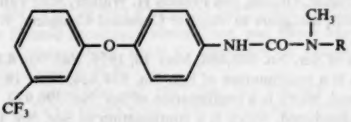
Filed Aug. 2, 1976, Ser. No. 710,828

Claims priority, application Germany, Aug. 27, 1975, 2538178

Int. Cl.² A01N *9/20*; C07C *127/19*

U.S. Cl. 71—120 **10 Claims**

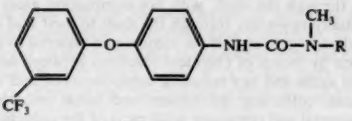
1. 4-(-Trifluormethylphenoxy)-phenylurea compound of the formula



in which

R is hydrogen or methyl.

5. Method of combating undesired vegetation which method comprises applying to such vegetation or its habitat, in post-emergence treatment, herbicidally effective amounts of a 4-(3-trifluoromethylphenoxy)-phenylurea compound of the formula



in which

R is hydrogen or methyl.

4,087,273

THIOCARBAMATE-BASED SUSTAINED RELEASE HERBICIDES

Charles Michael Garrison, Fairfield; Roy Clark Mast, Cincinnati, and Medford Dwight Robbins, Okeana, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 586,458, Jun. 12, 1975, abandoned. This application Aug. 30, 1976, Ser. No. 718,634

Int. Cl.² A01N *9/12*

U.S. Cl. 71—100 **5 Claims**

1. A sustained release herbicide composition comprising a solid solution or dispersion of from about 25% to about 70% by weight of substantially unpolymerized or undecomposed S-propyl dipropylthiocarbamate in an otherwise substantially dry, water-insoluble thermoplastic polymer matrix which is a member selected from the group consisting of cellulose acetate butyrate having a degree of acylation in the range from about 1.8 to about 2.7 and containing from about 10% to about 35% by weight of butyrate substituents and polypropylene having a flow point below the decomposition/polymerization temperature of S-propyl dipropylthiocarbamate.

4,087,274

METHOD OF PRODUCING A PARTIALLY REDUCED PRODUCT FROM FINELY-DIVIDED METAL SULPHIDES

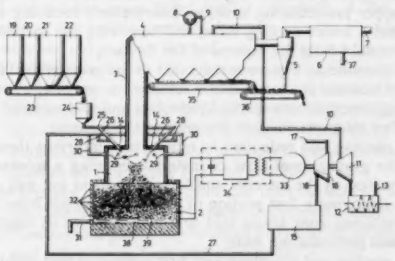
Ingvar A. O. Edenwall; Douglas Sewerin Ekman; Hans I. Elvander, all of Helsingborg; Karl Göran Görling, Lidingo; Carl Johan Sigvard Hellestam, and Karl-Axel Melkersson, both of Helsingborg, all of Sweden, assignors to Boliden Aktiebolag, Stockholm, Sweden

Filed Jun. 25, 1976, Ser. No. 700,031

Claims priority, application Sweden, Jul. 4, 1975, 7507696; Apr. 6, 1976, 7604046

Int. Cl.² C22B *4/00*

U.S. Cl. 75—10 R **24 Claims**



1. A method of producing from finely divided metal oxide containing material, selected from the group comprising ore concentrates with oxidic intermediate products, a partially reduced product, which is suited for final reduction, said method comprising the steps of introducing the finely divided metal oxide containing material and a finely divided solid carbonaceous reduction agent into a shaft at a distance from the lower portion thereof, contacting the metal oxide contain-

ing material and the reduction agent, while falling downwardly through the shaft, with hot combustion gases passing substantially upwardly through the shaft to melt said material and heat said agent and also to subject said material to an initial reduction by means of chemical reactions between said material, said agent and any reducing components of said combustion gases, collecting the molten and initial reduced metal oxide material and remaining solid parts of the reduction agent in the lower portion of the shaft to cause continued heat requiring reduction of said material in direct contact with said parts of the reduction agent, thereby forming a substantially solid product comprising partially reduced oxide material and solid carbon material.

4,087,275

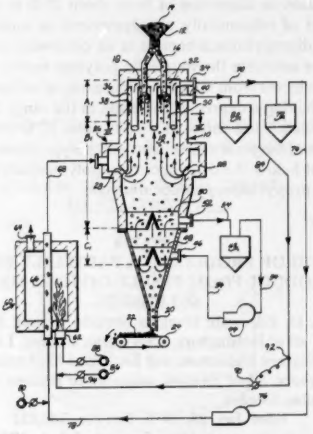
METHOD FOR DIRECT REDUCTION OF SULFUR-CONTAINING IRON ORE

Donald Beggs, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Division of Ser. No. 630,489, Nov. 10, 1975, Pat. No. 4,032,120. This application Dec. 22, 1976, Ser. No. 753,024

Int. Cl.[2] C21B *13/02*

U.S. Cl. 75—35 **10 Claims**



1. A method of producing a metallized product comprising:
(a) establishing a gravitational flow of particulate sulfur-containing metal oxide material by charging the material to the upper portion of a generally vertical furnace having an upper pre-reducing zone, an intermediate reducing zone and a lower cooling zone, and removing the metallized product from the bottom of the furnace;
(b) introducing a gaseous reductant to the gravitational flow of material at a temperature sufficient to promote a reducing reaction between said reductant and said material at a first inlet intermediate the ends of the furnace;
(c) causing said reductant to move countercurrent through the gravitational flow of material reducing a substantial portion of the material and forming a spent top gas;
(d) removing a first portion of said spent top gas from said reducing zone above said first inlet prior to its reaching said pre-reducing zone;
(e) cooling and scrubbing said first portion of said spent top gas, mixing it with a gaseous hydrocarbon, and passing the mixture through a catalyst-containing, reducing gas reforming furnace and introducing the reformed reducing gas to the reduction zone of the furnace as reductant; and
(f) removing the remaining portion of said spent top gas having passed through said pre-reducing zone, whereby sulfur is removed from said gravitational flow of material to said spent top gas in said pre-reducing zone, said first portion of said off-gas being substantially sulfur-free, thereby preventing sulfur contamination of the metallized product.

4,087,276

REMOVAL OF MERCURY FROM SLUDGE BY HEATING AND CONDENSING

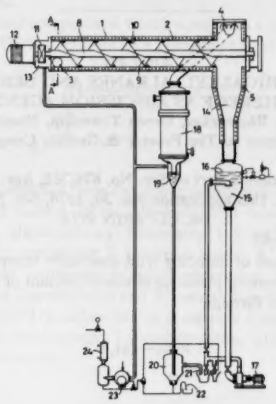
Gianni Generini, Ravenna, Italy, assignor to ANIC S.p.A., Palermo, Italy

Continuation of Ser. No. 683,093, May 4, 1976, abandoned. This application Jul. 15, 1977, Ser. No. 816,188

Claims priority, application Italy, May 5, 1975, 22997 A/75

Int. Cl.[2] C22B *43/00*

U.S. Cl. 75—81 **11 Claims**



1. A method for the removal of mercury from sludge containing mercury, comprising the steps of:
(a) heating the sludge at a temperature of from 200° C to 340° C and at a pressure of from 0.06 to 0.1 atmospheres to vaporize the mercury, the sludge having a pH of from 8 to 9 and containing less than 45 to 50% water;
(b) condensing mercury vapor from step (a) at a temperature of from 20° C to 50° C and at a pressure of from 0.06 to 0.1 atmospheres; and
(c) then condensing at a temperature comprised between 5° C and 30° C and at a pressure of from 2 to 3 atmospheres the mercury vapor from step (a) not condensed in step (b).

4,087,277

N-(1,1-SUBSTITUTED ACETONITRILO)-α-(3,5-SUBSTITUTED PHENOXY) ALKYL AMIDES AND THEIR USE AS HERBICIDES

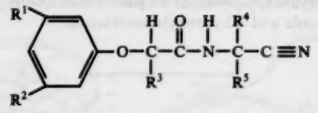
Don R. Baker, Orinda, and Francis H. Walker, Mill Valley, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 688,498, May 20, 1976, Pat. No. 4,052,432, which is a continuation of Ser. No. 524,424, Nov. 18, 1974, abandoned, which is a continuation of Ser. No. 396,922, Sep. 13, 1973, abandoned, which is a continuation of Ser. No. 157,059, Jun. 25, 1971, abandoned. This application Jun. 23, 1977, Ser. No. 809,224

Int. Cl.[2] A01N *9/20*

U.S. Cl. 71—105 **3 Claims**

1. The method of controlling undesirable vegetation which comprises applying to the area where control of said vegetative growth is desired, a growth controlling amount of a compound having the formula



in which R^1 and R^2 are both methyl or both chlorine; R^3 is ethyl, R^4 is methyl and R^5 is methyl.

4,087,278

HERBICIDAL CHLORAL HYDRATE BIS-ESTER OF 2,2,3-TRICHLOROPROPIONIC ACID

Yog R. Dhingra, and Zdravko Jezic, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 343,717, Mar. 21, 1973, Pat. No. 3,882,170. This application Sep. 3, 1974, Ser. No. 502,709

Int. Cl.² A01N *9/24*

U.S. Cl. 71—106 **2 Claims**

1. A process for controlling plants which comprises contacting plant seeds by impregnating soil containing their seeds with a seed growth-inhibiting amount of the chloral hydrate bis-ester of 2,2,3-trichloropropionic acid.

4,087,279

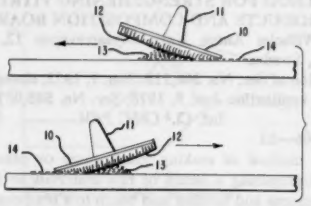
METHOD FOR TONING TACKY SURFACES

Helmut Gustav Sandner, Oceanport, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 18, 1975, Ser. No. 605,541

Int. Cl.² B05D *3/06*

U.S. Cl. 96—1 SD **6 Claims**



1. A method for development of a surface having imagewise tacky and nontacky areas comprising arranging toner particles in the form of at least one elongated mound directly on a section of said surface and then distributing said toner particles over said surface by pushing the elongated mound of toner particles across said surface with at least one pad having a resilient underlayer with at least a portion of the mound beneath the pad, whereby the distributed toner particles become imagewise adhered to said tacky surface.

4,087,280

METHOD FOR ENHANCING THE IMAGE CONTRAST IN COLOR TELEVISION PICTURE TUBES

Stanley Donald Stookey, Painted Post, and Brent Merle Wedding, Corning, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 17, 1977, Ser. No. 778,362

Int. Cl.² G03C *5/04, 5/00, 7/00*; C03C *15/00*

U.S. Cl. 96—27 R **19 Claims**

1. A method for preparing a pattern of integral transparent color filter areas for the face plate of a color television picture tube, said face plate having a tri-color screen composed of patterned color triads of red, green, and blue phosphors, and said color filter areas being highly absorbing in the green portion of the visible spectrum but only weakly absorbing in the blue and red portions thereof, which comprises the steps of:

(a) forming a photosensitive glass body suitable as a face plate for a color television picture tube or a photosensitive glass body suitable for attachment to said face plate to form a composite body consisting essentially, in weight percent on the oxide basis as calculated from the batch, of about 12–15% Na_2O, 1–4% K_2O, 5–9% BaO, 0.01–2% Sb_2O_3, 0.006–0.3% CeO_2, 0.006–0.02% Au, and 70–73% SiO_2;

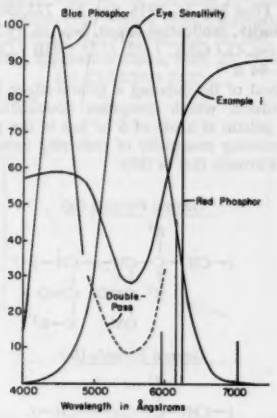
(b) placing an appropriate mask opaque to ultra-violet radiation or X-radiation having apertures therein at the proper location and of the appropriate geometry on or near said glass body to register with the subsequently to be applied red and blue phosphor members of said color triads;

(c) exposing said glass body through said mask to ultra-violet radiation or X-radiation;

(d) heating said glass body to about 575°–650° C. to bring out said color in said exposed area; and then

(e) cooling said glass body to room temperature.

9. A method for preparing a pattern of integral transparent color filter areas for the face plate of a color television picture tube, said face plate having a tri-color screen composed of patterned color triads of red, green, and blue phosphors, and



said color filter areas being highly absorbing in the green portion of the visible spectrum but only weakly absorbing in the blue and red portions thereof, which comprises the steps of:

(a) melting a batch for a glass consisting essentially, in weight percent on the oxide basis as calculated from the batch, of about 12–15% Na_2O, 1–4% K_2O, 5–9% BaO, 0.01–2% Sb_2O_3, 0.006–0.02% Au, 70–73% SiO_2, and a reducing agent in sufficient amounts to cause the resulting glass to be in a highly reduced condition;

(b) forming a glass body from said melt suitable for attachment to said face plate to form a composite body;

(c) heating said glass body to about 575°–650° C. to bring out said color throughout said glass body;

(d) cooling said glass body to room temperature;

(e) placing a mask having apertures therein at the proper locations and of the appropriate geometry on said glass body to protect the glass body except areas thereof in registry with the subsequently to be applied green member of the color triads; and then

(f) removing the unprotected areas of glass through mechanical abrasion or chemical leaching to remove said color therefrom.

4,087,281

METHOD OF PRODUCING OPTICAL IMAGE ON CHROMIUM OR ALUMINUM FILM WITH HIGH-ENERGY LIGHT BEAM

Minoru Toda, and Susumu Osaka, both of Machida, Japan, assignors to RCA Corporation, New York, N.Y.

Filed Sep. 19, 1975, Ser. No. 614,855
Int. Cl.[2] G03C 5/00
U.S. Cl. 96—36 13 Claims

1. A method of producing an image on a metallic film comprised of at least one layer, wherein said one layer, having a thickness less than about 2,000 angstroms, is a material selected from the group consisting of chromium and aluminum, wherein said method comprises the steps of:

exposing said one layer to a light pattern, said light pattern having an energy intensity level which at least approximately corresponds to the melting point of said one layer in said metallic film but is below the threshold for evaporation of said metallic film to form a latent image; and

contacting said film with an etchant to develop said latent image.

4,087,282

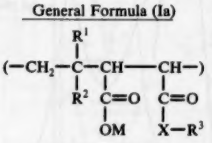
FLOCCULATING AGENT FOR PHOTOGRAPHIC EMULSIONS

Akio Mitsui; Takushi Miyazako, and Takashi Ogawa, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

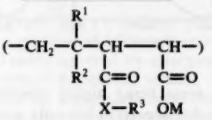
Filed Sep. 16, 1976, Ser. No. 723,858
Claims priority, application Japan, Sep. 16, 1975, 50-111913
Int. Cl.[2] G03C 1/02, 1/72; C02B 1/20
U.S. Cl. 96—94 R 18 Claims

1. A method of flocculating a gelatin-silver halide photographic emulsion, which comprises flocculating the silver halide with gelatin at a pH of 6 or less in the presence of a polymer consisting essentially of recurring units represented by General Formula (Ia) or (Ib):

General Formula (Ia)



General Formula (Ib)



in which R^1 and R^2, which can be the same or different, represent aliphatic groups, R^3 represents a hydrogen atom, an aliphatic group, an aryl group or an aralkyl group, X represents —O— or —NH—, M represents a cation and X and R^3 may be linked to each other to form a cyclic amino group.

4,087,283

COMPOSITION FOR HARDENING PHOTOGRAPHIC HYDROPHILIC BINDER AND PHOTOGRAPHIC ELEMENT CONTAINING THE SAME

Angelo J. Battisti, Windsor, N.Y., assignor to GAF Corporation, Wayne, N.J.

Filed Mar. 1, 1976, Ser. No. 662,939
Int. Cl.[2] G03C 1/30, 1/40
U.S. Cl. 96—111 5 Claims

1. A photographic element comprising at least one supported layer of a photographic silver halide emulsion in a hydrophilic binder hardened by a hardener composition comprising a carbodiimide hardening agent and from about 5 to about 200 mole percent, based on the carbodiimide hardening agent, of an N-hydroxy succinimide, N-hydroxyphthalimide, N-hydroxypiperidine, 3-hydro-4-oxo-3,4-dihydro-1,2,3-benzotriazole and 1-hydroxybenzotriazole.

4,087,284

COLOR-DEVELOPER COATING FOR USE IN COPY SYSTEMS

Ronald Golden, Mount Prospect; Allan H. Cohen, Evanston, and David G. Eby, Chicago, all of Ill., assignors to Champion International Corporation, Stamford, Conn.

Filed Jun. 7, 1976, Ser. No. 693,160
Int. Cl.[2] C09D 11/00; B41M 5/16, 5/22
U.S. Cl. 106—21 13 Claims

1. A process for preparing a color-developer coating which comprises mixing an oily solution of an acidic organic acceptor material capable of developing a color when contacted with a basic chromogenic material in a water-immiscible organic liquid, an aqueous solution of an emulsifier, and an insoluble, particulate, oil-adsorbent extender to form an emulsion-dispersion comprising a dispersion of said particulate oil-adsorbent extender in an oil-in-water emulsion of said oily solution in said aqueous solution.

4,087,285

METHOD FOR STRENGTHENING VITREOUS PRODUCTS AND COMPOSITION BOARDS

Fredrik Wilhelm Anton Kurz, Nysatravagen 12, S-181 61 Lidingo, Sweden

Continuation of Ser. No. 366,113, Jun. 1, 1973, abandoned. This application Jun. 9, 1975, Ser. No. 585,057
Int. Cl.[2] C03C 3/04
U.S. Cl. 106—52 4 Claims

1. In a method of making glass, glaze or cement which comprises preparing a batch of raw-materials to form glass, glaze or cement and heating said batch to a temperature above 1000° C. for a period of from a few minutes to 5 hours to convert said batch into glass, glaze or cement, the improvement which comprises including in said batch, before said heating takes place, from 1 to 20% by weight of said components of amorphous fly or filter dust having a specific surface area of at least 20 m^2/g and containing from 75% to 92% SiO_2 and the remainder compounds selected from the group consisting of MgO, Cr_2O_3, FeO, Fe_2O_3, MnO_2, CuO, ZnO, ZrO_2, TiO_2, Ni_2O_3, PbO, C, S and mixtures thereof to form a eutectic which lowers the melting and sintering points of the raw material.

4,087,286

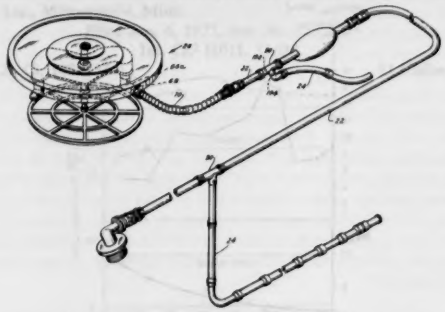
SWIMMING POOL CLEANING DEVICE

Wilson B. Sexton, Dallas, and Frankie N. Spencer, McKinney, both of Tex., assignors to Airwick Pool Products, Inc., Richardson, Tex.

Filed Jan. 25, 1977, Ser. No. 762,305
Int. Cl.[2] B08B 3/02, 9/08
U.S. Cl. 134—167 R 17 Claims

15. In a swimming pool cleaning apparatus including a water supply hose, a plurality of whipping hoses connected to the supply hose and a buoyant head including a water manifold having water jet openings therein for moving the whipping hoses about the pool, the improvement comprising separate

means for connecting each whipping hose to the water supply hose; each of said connecting means including means for con-



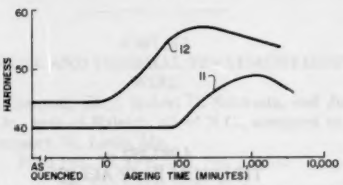
trolling water flow to its associated whipping hose; and separate means for controlling water flow to said manifold.

4,087,287

METHOD FOR PROVIDING FERRITIC-IRON-BASED ALLOYS

John S. Dunning; Mark I. Copeland, both of Corvallis, and John S. Howe, Albany, all of Oreg., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Apr. 15, 1977, Ser. No. 788,059
Int. Cl.² C21D *6/02*
U.S. Cl. 148—3 **3 Claims**



1. A method of producing strengthened creep resistant ferritic iron alloys, said method comprising:

(a) forming a molten metal alloy by melting iron together with at least first and second alloying metals of the type that form Laves phases, said first alloying metal comprising one to five weight percent of at least one metal selected from the group consisting of tantalum, columbium, and a mixture of tantalum and columbium, and said second alloying metal comprising one to eight weight percent of at least one metal selected group the group consisting of molybdenum, tungsten, and a mixture of molybdenum and tungsten, the total of said Laves phase- forming alloying metals being no more than ten weight percent in excess of that necessary to react with interstitial elements that may be added to the alloy, and wherein at least a metal selected from the group consisting of aluminum, chromium or a mixture thereof is added to said alloy to provide oxidation resistance,

(b) shaping said molten metal alloy by casting;

(c) solution heat treating the alloy to precipitate Laves phases therein;

(d) quenching said alloy to a temperature at or below that suitable for aging; and

(e) aging said alloy at a temperature sufficient to produce fine dispersions of Laves phases in the iron matrix of said alloy.

4,087,288

SOLAR ABSORBER SURFACES

Alan Forrest Reid, Hawthorn, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed Jul. 14, 1976, Ser. No. 705,195
Int. Cl.² F24J *3/02*; B05D *3/10, 1/18*
U.S. Cl. 148—6.2 **12 Claims**

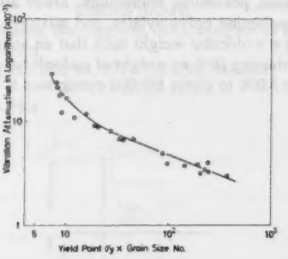
1. A method for improving the selectivity of a black copper oxide absorber surface which comprises contacting the surface with a solution containing chromate ions and ammonium ions for a period of time sufficient to increase solor absorption characteristics and minimize infrared re-emission characteristics of said black copper oxide absorber surface.

4,087,289

ANTI-VIBRATION STEEL MATERIAL AND A PRODUCTION METHOD THEREFOR

Hisashi Gondo; Mitsunobu Abe; Matsuo Usuda, all of Kisarazu; Kunihiko Komiya, Kimitsu, and Tsuyoshi Kawano, Kisarazu, all of Japan, assignors to Nippon Steel Corporation, Japan

Filed Mar. 24, 1977, Ser. No. 781,000
Claims priority, application Japan, Mar. 27, 1976, 51-33102
Int. Cl.² C21D *7/02*
U.S. Cl. 148—12 R **7 Claims**



1. An anti-vibration steel material containing not more than 0.1% of carbon, not more than 0.5% manganese and unavoidable impurities with the balance being iron having a logarithmic attenuation of not less than 0.006 when given vibration of 0.01% of surfacial strain, and not lower than 55 ot α value defined below

$$\alpha = \sigma_y \times N$$

where

σ_y is yield point or stress (kg/mm²) at 0.2% strain

N is grain size number

and $N =$

$$1 + \frac{1}{0.301} \log\left\{500\left(\frac{M}{100}\right)^2 \left(\frac{n_1 \times n_2}{L_1 \times L_2}\right)\right\}$$

in which

M is observation magnification.

L_1 (L_2) is the total (mm) of lengths of line components in one direction of line components crossing each other at right angle.

n_1 (n_2) is the total number of the grains cut by L_1 (L_2).

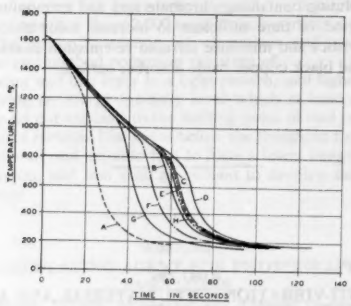
4,087,290
PROCESS FOR THE CONTROLLED COOLING OF FERROUS METAL

Karl-Heinz Kopietz, Drexel Hill, Pa., and Francis S. Munjat, late of Rosemont, Pa. (by Ada C. Munjat, executrix), assignors to E. F. Houghton & Co., Philadelphia, Pa.

Filed Jul. 3, 1975, Ser. No. 587,735

Int. Cl.[2] C21D *1/48;* B23K *35/24;* C09K *50/00*

U.S. Cl. 148—18 **4 Claims**



1. In a process of quenching which is useful in the heat treatment of metals wherein a metal is heated to an elevated temperature and said heated metal is then quenched in a bath comprising a liquid quenching medium to effect desirable metallurgical changes in the metal, the improvement which comprises using as said quenching medium an aqueous solution containing from about 0.1% to about 6% by weight of a water-soluble salt of polyacrylic acid selected from the group consisting of sodium, potassium, ammonium, lower alkylamine and lower alkanolamine polyacrylates, and mixtures thereof, said salt having a molecular weight such that an aqueous solution thereof containing 20% by weight of said salt has a viscosity of from about 5,000 to about 100,000 centipoises at 25° C.

4,087,291
CERIUM MISCH-METAL/COBALT MAGNETS

Sevi Gaiffi; Anton Menth, both of Nussbaumen, and Hartmut Nagel, Baden, all of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Continuation of Ser. No. 603,726, Aug. 11, 1975, abandoned. This application Jun. 17, 1977, Ser. No. 808,135

Claims priority, application Switzerland, Aug. 13, 1974, 11025/74

Int. Cl.[2] H01F *1/02;* C04B *35/00*

U.S. Cl. 148—31.57 **20 Claims**

1. A magnetic material of the formula

$(CeMM_{1-x}Ce_x)_{1-y}Sm_yCo_{5\pm0.2}$, wherein $0.05 < x < 0.25$ and $0 \leqq y \leqq 0.25$ and CeMM is a cerium misch-metal of the formula

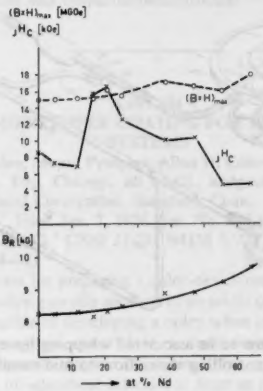
$Ce_\alpha La_\beta Nd_\gamma Pr_\delta$, wherein

$0.45 < \alpha < 0.55$

$0.20 < \beta < 0.40$

$0.05 < \gamma < 0.15$

$0.00 < \delta < 0.05$ and $\alpha + \beta + \gamma + \delta \simeq 1$ wherein the added quantities of Ce added are within the range at which the



coercive field strength is increased and less than the quantity at which the coercive field strength deteriorates.

4,087,292
TITANIUM BASE ALLOY

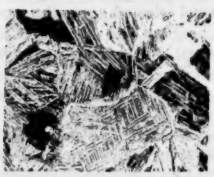
Donald Francis Neal, Whittington, near Lichfield, and Paul Addyman Blenkinsop, Sutton Coldfield, both of England, assignors to Imperial Metal Industries (Kynoch) Limited, Birmingham, England

Filed May 6, 1976, Ser. No. 683,948

Claims priority, application United Kingdom, May 7, 1975, 19130/75

Int. Cl.[2] C22C *14/00*

U.S. Cl. 148—32.5 **9 Claims**



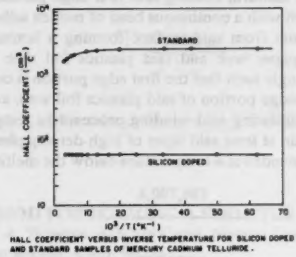
1. A titanium alloy consisting essentially of 5.4 to 5.5wt% aluminium, 3.5wt% tin, 3wt% zirconium, 1wt% niobium, 0.25 to 0.3wt% molybdenum, 0.3wt% silicon, balance titanium, apart from incidental impurities, the alloy being heat treated by soaking in the beta field at 1010° C to 1050° C, cooling to ambient temperature and then ageing for a period of about 24 hours at a temperature in the range 500° to 600° C.

4,087,293

SILICON AS DONOR DOPANT IN $HG_{1-x}CD_xTE$

Robert A. Lancaster, Brookline, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 6, 1977, Ser. No. 757,270
Int. Cl.² H01L *31/00*
U.S. Cl. 148—33 11 Claims



HALL COEFFICIENT VERSUS INVERSE TEMPERATURE FOR SILICON DOPED AND STANDARD SAMPLES OF MERCURY CADMIUM TELLURIDE.

1. A composition, comprising mercury cadmium telluride having a quantity of silicon dispersed therein.

4,087,294

LITHIUM DOPED MERCURY CADMIUM TELLURIDE

Eric S. Johnson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 6, 1977, Ser. No. 757,267
Int. Cl.² H01L *31/00*
U.S. Cl. 148—33 9 Claims

1. Mercury cadmium telluride having a quantity of lithium dispersed therein, in an amount sufficient to measurably increase the acceptor concentration thereof.

4,087,295

MECHANICAL AND THERMAL TREATMENT OF STEEL WIRE

Michael R. Sargent, Cary; Robert G. Schwartz, and John G. Brown, Jr., both of Raleigh, all of N.C., assignors to Monsanto Company, St. Louis, Mo.

Filed Feb. 25, 1972, Ser. No. 229,515
Int. Cl.² C21D *1/80, 9/52*
U.S. Cl. 148—143 19 Claims

1. A method for making twisted steel wire strand or cord having substantially no residual tensile, torsional or bending stresses which comprises, sequentially

a. twisting a plurality of steel wires to form a twisted strand or cord,
b. continuously heating the twisted strand or cord above the critical range to austenitize and homogenize the strand or cord structure,
c. continuously quenching the strand or cord to a quenched martensitic structure, essentially absent retained austenite, and
d. tempering the quenched martensite.

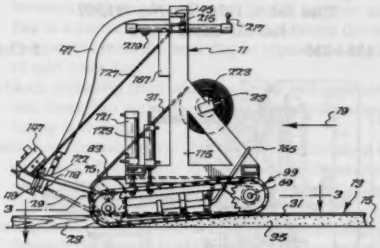
4,087,296

METHOD FOR APPLYING MEMBRANE-COVERED RIGID FOAM TO BUILDING SURFACE

Thomas Hooker, 560 Lockport St., Youngstown, N.Y. 14174

Division of Ser. No. 481,344, Jun. 20, 1974, Pat. No. 3,954,544.
This application May 3, 1976, Ser. No. 682,468
Int. Cl.² B32B *5/20*
U.S. Cl. 156—71 10 Claims

1. A process for in situ preparation of a continuous foam-membrane sandwich and application thereof to a building surface which comprises depositing a fluid curable pre-foam of a rigid polymeric material between the building surface and the membrane while holding the membrane away from the building surface so that the pre-foam contacts the building surface and the membrane and moving forward on the building surface the locus of application of the pre-foam while maintaining a portion of the continuous membrane above the pre-foam being



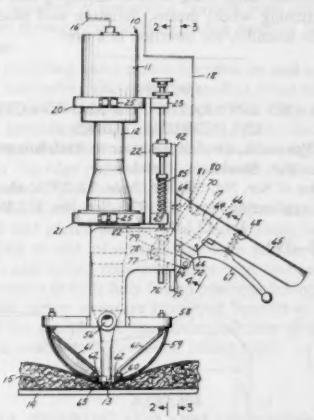
deposited and in contact therewith and curing the pre-foam to a rigid state so that a continuous foam-membrane sandwich is produced in which the rigid foam is held to the building surface and the membrane which covers it.

4,087,297

HAND HELD WELDING DEVICE, AND METHOD OF USING SAME

Charles A. Johnson, Rockingham, N.C., assignor to Home Curtain Corporation

Filed Jul. 14, 1977, Ser. No. 815,523
Int. Cl.² B32B *31/20*
U.S. Cl. 156—73.4 4 Claims



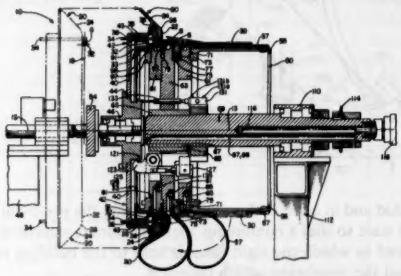
1. In an ultrasonic welding device including a hand-held horn adapted to be manually moved over a worktable forming a cooperating anvil, said horn communicating with a source of ultrasonic power, the improvement comprising: said horn having a generally axially positioned tip at a lower end thereof and a guide at least partially surrounding said tip and positioned to contact a workpiece disposed on said worktable; said guide being axially adjustable relative to said tip to vary the effective pressure of said tip upon said workpiece.

4,087,298

TIRE BEAD CORE-APEX ASSEMBLY

Clifford O. Mangun, Akron; Max D. Brinkley, North Canton, and Paul E. Appleby, Cuyahoga Falls, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jul. 1, 1976, Ser. No. 701,937
Int. Cl.[2] B29H *17/32*
U.S. Cl. 156—136 5 Claims



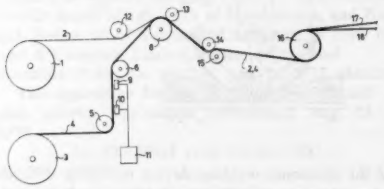
1. The method of making a tire bead assembly in circular form free of forced displacement thereof from said circular form comprising placing a bead core on a rigid continuous annular surface having a fixed diameter disposed concentrically about an axis perpendicular to the plane of said bead core, forming an endless apex strip circumferentially on and around an uninflated inflatable annular bladder at a plane parallel to the plane of said core with the major cross-section dimension of the apex strip extending axially away from said core and the base of said strip in the second said plane, said bladder being coaxial with respect to said annular surface, moving the bead core coaxially to a location closely proximate to the base of said apex strip on the bladder, and then inflating the bladder to move said major dimension of the apex strip angularly into coplanar surrounding relation and to compact said strip to coherent relation with said bead core, and further to contact with said annular surface, said bead core and said apex strip being there supported uniformly without radial displacement from said circular form, then, without engaging said assembly with any stitching wheel means, deflating said bladder and removing the assembly for insertion in a tire.

4,087,299

METHOD AND APPARATUS FOR MANUFACTURING CYLINDRICAL TUBES

Rolf Berg, Djursholm, Sweden, assignor to Aktiebolaget Statens Skogsindustrier, Stockholm, Sweden

Continuation of Ser. No. 557,846, Mar. 12, 1976, abandoned. This application Nov. 15, 1976, Ser. No. 742,154
Int. Cl.[2] B65H *81/00*
U.S. Cl. 156—192 6 Claims



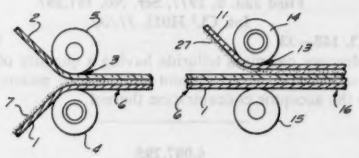
1. A method of manufacturing cylindrical tubes comprising the steps of: helically winding a high-density plastics foil web and at least one paper web on a rotating mandril, a side of the paper web which is adjacent the high-density plastics foil web being coated with a plastics substance which becomes tacky when heated, moving said paper web past a heat source, said heat source arranged to soften the plastics substance to said tacky state, contacting the high-density plastics foil web with the tacky surface of said paper web in a manner such that a first edge portion of the high-density plastics foil web projects at a substantially constant width outside one side edge of the paper web creating a laminar web formed by the high-density plastics foil web and the paper web, feeding said laminar web to a mandril with the plastics foil web in contact with a forming surface of said mandril, coating said first edge portion of the plastics foil web with a continuous bead of molten adhesive on the side opposite from said surface forming a laminar web, winding said paper web and said plastics foil web on said mandril at an angle such that the first edge portion is contacted with a second edge portion of said plastics foil web, and cooling said mandril during said winding process to a temperature so as to maintain at least said layer of high-density plastics foil nearest to the mandril at a temperature below the melting point of said foil.

4,087,300

PROCESS FOR PRODUCING METAL-PLASTIC LAMINATE

Edward Adler, 266 Arch Rd., Englewood, N.J. 07631

Continuation of Ser. No. 431,500, Jan. 7, 1974, abandoned. This application Jul. 16, 1975, Ser. No. 596,360
Int. Cl.[2] B32B *15/08, 31/20*
U.S. Cl. 156—184 19 Claims



1. A process for preparing a laminate comprising at least one metallic foil and a resinous substrate consisting essentially of:

(a) preliminarily bonding said metal foil and resinous plastic substrate employing a meltable, curable resinous adhesive, said preliminary bonding being carried out under sufficient pressure and temperature such that the metal foil and resinous substrate are thoroughly wetted with the resinous adhesive, to form a preliminarily bonded laminate; and

(b) heating said preliminarily bonded laminate in an autoclave for a time sufficient to complete curing and bonding, the pressure in said autoclave being greater than the total vapor pressure generated at the interface of the metal foil and resinous plastic substrate by the curing and heating of said resinous plastic substrate and resinous adhesive.

4,087,301

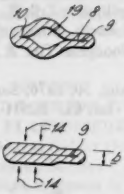
METHOD OF FORMING A FLOW RESTRICTOR

Brian Lee Steadman, Alcester, England, assignor to Avon Medicals Limited, England

Filed Aug. 13, 1976, Ser. No. 714,117
Claims priority, application United Kingdom, Aug. 22, 1975, 34989/75
Int. Cl.[2] B29C *17/00;* F16K *7/06*
U.S. Cl. 156—198 6 Claims

1. A method of forming a flow restrictor which comprises positioning a thin, elongate member within a flexible tube, flattening the tube about the member to bring internal wall surfaces of the tube into contact with each other at each lateral side of the member, permanently securing the contacting wall surfaces to each other at each lateral side of the member but over only a part of the area of the internal wall surface of the tube on at least one lateral side of the member and removing

the member to leave a flow passage of a cross-section defined by that of the member, and the unsecured part of the internal



wall surface of the tube defining a bypass in parallel with the flow passage.

4,087,302

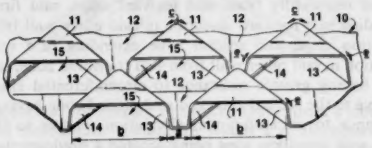
METHOD FOR FORMING A STRUCTURAL PANEL

William A. Wootten, 425 Via Corta, Malaga Cove Plaza, Palos Verdes Estates, Calif. 90274

Division of Ser. No. 598,484, Jul. 23, 1975, Pat. No. 4,027,058. This application May 18, 1977, Ser. No. 798,209

Int. Cl.[2] B32B *31/00*

U.S. Cl. 156—204 **10 Claims**



1. The method of forming a structural medium comprising the steps of slitting a planar web of material to provide a plurality of spaced aligned slits along each of a plurality of parallel rows, the unslit portion of said web between adjacent ends of the slits in each row having a length in the range of 5% to 15% of the length of each slit in that row, the unslit portions of the webs in each row being positioned opposite slit portions of the web in the adjacent rows, and depressing the portions of said web along said slits away from the plane of said web and into a plane parallel with the plane of said web while simultaneously folding the material of said web into planes disposed transverse to the plane of said web along pairs of lines which extend respectively from opposing ends of each slit in each row in converging relation to one another toward an unslit portion of the web in an adjacent row, to deform the surface of said web into an array of closely adjacent triangular projections and depressions which are disposed in alternately inverted relation to one another between each adjacent pair of said rows and from row to row.

4,087,303

GLUE APPLICATOR

Marion W. Strzalka, P.O. Box 64, Big Bear, Calif. 91215

Filed Feb. 2, 1976, Ser. No. 654,287

Int. Cl.[2] B65C *11/04*

U.S. Cl. 156—357 **6 Claims**

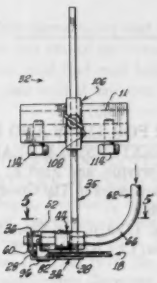
1. A glue applicator for a carton sealing machine of the character described for receiving along an infeed path to the machine a flattened carton structure having a rectangular panel and inner and outer flaps hinged along opposite edges of said panel and disposed in folded positions wherein said flaps are folded against one side of said panel with the outer edge portion of said outer flap overlying the outer edge portion of said inner flap, and the machine comprising a pair of infeed rolls at opposite sides of said path for compressing the flattened carton structure between the rolls, said glue applicator comprising:

a carton support to be located along said infeed path comprising a thin flanged plate including a relatively wide normally horizontal portion forming a platen for entrance between said carton panel and inner flap to support said inner flap substantially in its folded position, and an upstanding flange along one edge of said platen for entrance between said panel and outer flap to support said outer flap in a partially unfolded position wherein the outer flap is separated from the inner flap to expose said edge portion of said inner flap,

a block extending from said flange over said platen to overlie said inner flap with the normally under side of said block facing said platen,

said block containing two laterally communicating bores on parallel axes normally to said flange and parallel to said platen, one bore opening laterally through the under side of said block toward said platen,

an applicator roller rotatable in said one bore and protruding through the open side of the latter bore toward said platen for contact with said edge portion of said inner flap during movement of said inner flap along said platen,



means adjustably securing said block to said flange for adjustment of said block toward and away from said platen to adjust the spacing between said roller and platen,

a spreading roller rotatable in the other bore of said block and disposed in peripheral contact with said applicator roller through the communicating opening between said bores,

means including valve means operable by said carton structure for feeding glue to said spreading roller during movement of said carton structure past said support, whereby said spreading roller applies said glue to said applicator roller and the latter roller rolls a thin film of glue onto said inner flap edge portion during movement of said inner flap past said applicator roller, and

means for adjustably mounting said support on said machine with said platen parallel to a plane passing between and tangent to said infeed rolls and with said support spaced from said infeed rolls a distance such that said flaps are returnable to their fully folded positions during movement of the carton structure from said support to said infeed rolls for entrance of the carton structure in its fully flattened condition between the infeed rolls.

4,087,304

LABEL PRINTING AND APPLYING APPARATUS

Paul H. Hamisch, Jr., Franklin, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

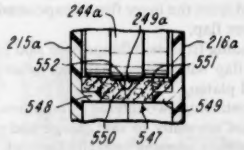
Division of Ser. No. 449,111, Mar. 7, 1974, abandoned, which is a division of Ser. No. 312,454, Dec. 6, 1972, Pat. No. 3,968,745, which is a continuation-in-part of Ser. No. 208,035, Dec. 8, 1971, abandoned. This application Jan. 23, 1976, Ser. No. 651,758

Int. Cl.[2] B32B *35/00;* **B41M** *1/40*

U.S. Cl. 156—384 **7 Claims**

1. Apparatus for printing and dispensing pressure sensitive labels utilizing a supply roll comprising a web of supporting

material and pressure sensitive labels having a coating of pressure sensitive adhesive and being releasably adhered to the supporting material web, the apparatus comprising: a housing, a delaminator carried by the housing for delaminating successive labels from the supporting material web, a feed wheel



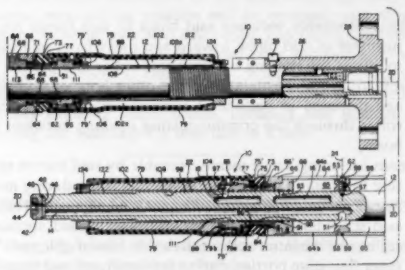
having teeth engageable with the supporting material web downstream of the delaminator, and an applicator disposed in the housing and in contact with the outer periphery of the feed wheel for applying lubricant to the feed wheel to prevent the accumulation of adhesive on the feed wheel.

4,087,305

BUILDING ARBOR FOR TIRES AND LIKE ARTICLES HAVING INEXTENSIBLE BEAD RINGS

John W. Touchette, Hartville, and Paul E. Appleby, Cuyahoga Falls, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jun. 1, 1976, Ser. No. 691,275
Int. Cl.[2] B29H *17/22*
U.S. Cl. 156—401 1 Claim



1. A building arbor for use in building a flexible cylindrical article having at least one end portion turned or folded about an inextensible bead ring, which arbor in use is free of relatively moving metal parts, such arbor comprising a shaft, rigid cylindrical building surface having a multiplicity of perforations therethrough, a circumferentially expandable elastomeric ring having an inflatable bladder attached integrally thereto and extending axially away from said surface and disposed close to and at the same radial level as said surface, said expandable ring having a coaxial groove in its radially outward surface, an expandable sleeve secured to said shaft coaxially of each expandable ring, an annular recess defining with said expandable sleeve an inflation chamber, said sleeve having a plane of maximum circumferential elongation midway between its circumferential edges, said plane being axially inward of the associated expandable ring so that on being inflated the sleeve expands the expandable ring and rotates each axial cross-section thereof angularly with respect to the shaft, thereby expanding more at its axially inward side than at its axially outward side relative to an inextensible ring disposed therearound.

4,087,306

TURN-UP OR TURN-OVER BLADDER FOR TIRE BUILDING MACHINES

William J. Head, Rollingen; Erik R. Kampinga, Ettelbruck, and John Kolbjorn Rodseth, Bonnevoie, all of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 30, 1976, Ser. No. 719,050
Int. Cl.[2] B29H *17/22*
U.S. Cl. 156—401 38 Claims

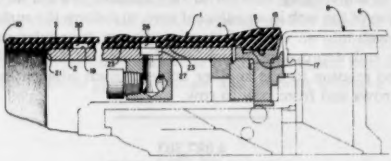
1. An annular bladder providing, when disposed on support means, both circumferential expansion and rolling movement normal to its circumference in response solely to inflation and deflation thereof, said bladder having a cylindrical outer wall extending uninterruptedly from a forward edge to a rearward edge and being turned radially and axially inward at the respective edges, the bladder comprising a first and a second circumferential zone and in said outer wall a transition zone spaced rearwardly from said forward edge, said first zone extending in a forward direction in said outer wall from said transition zone, said second zone extending in a rearward direction in said outer wall from said transition zone, said first zone having greater resistance to circumferential elongation relative to the second zone and said second zone having lesser resistance to circumferential elongation relative to the first zone, said transition zone being located a predetermined distance forward of the rearward edge of said bladder when the same is uninflated, said rolling movement being in the direction of said forward edge on inflation and toward said rearward edge on deflation of said bladder.

4,087,307

INFLATABLE BLADDER FOR A TIRE BUILDING DRUM

William J. Head, Rollingen, and Richard Carl von der Heyde, Warken, both of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 30, 1976, Ser. No. 719,046
Int. Cl.[2] B29H *17/24*
U.S. Cl. 156—401 3 Claims



1. A turnup bladder and a tire building drum, the drum having a circumferential bladder seating groove open radially outwardly thereof and a circumferentially extending outwardly open U-shaped channel for air spaced axially from said groove, said bladder being secured to said drum only by its own elastic tension, said bladder comprising an annular inflatable tube having in its uninflated condition an inner edge disposed proximate said groove, an outer edge disposed at an axial distance from the groove and a generally cylindrical wall extending between said inner and said outer edge and snugly engaging said drum, an elastic ring secured integrally to said inner edge and adapted to seat snugly conjugately in said groove, a pair of circumferentially extending ribs integral with said wall snugly engaging said drum circumferentially respectively adjacent and axially outward of said channel, and a

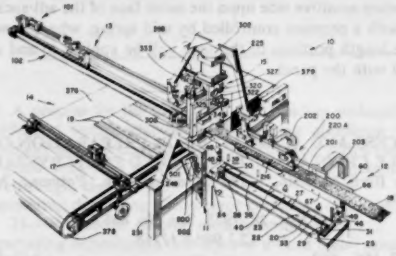
flangeless port in said wall between said ribs providing open communication between said bladder and said channel for air flow therebetween independent of the relative angular relation of said bladder and said drum.

4,087,308

APPARATUS AND METHOD FOR MAKING REINFORCED ELASTOMERIC FABRIC

Robert Charles Baugher, Akron; Robert Henry Bond, Cuyahoga Falls; Walter William Immel, Sr., Stow, and Ralph Frederick Kiemer, Akron, all of Ohio, assignors to The Steelastic Company, Akron, Ohio

Filed Apr. 14, 1976, Ser. No. 676,903
Int. Cl.[2] B29H *17/00*
U.S. Cl. 156—405 R **44 Claims**



1. Apparatus for making reinforced fabric from a ribbon of uncured elastomeric material in which a reinforcement has been encapsulated comprising: a frame; a lead-in mechanism from which the ribbon is withdrawn; an assembly mechanism supported by said frame and upon which adjacent strips of ribbon are joined to form the fabric; a guillotine mechanism mounted on said frame between said lead-in and assembly mechanisms, operable to sever measured lengths of the reinforced elastomeric ribbon deposited on said assembly mechanism; means for tilting said guillotine mechanism; a primary shuttle carrier located above said assembly mechanism; a stabilizing shuttle carrier located above said lead-in mechanism; a shuttle head mounted on said primary carrier for movement with and with respect thereto; first actuating means to move said primary shuttle carrier and said shuttle head in a generally vertical direction; yoke means interconnecting said primary and stabilizing shuttle carriers to effect vertical movement of said stabilizing shuttle carrier concurrently with said primary shuttle carrier for movement of said shuttle head onto and away from said lead-in mechanism and said assembly mechanism; second actuating means selectively to protract and retract said shuttle head horizontally with respect to said primary carrier whereby a length of ribbon is withdrawn from a position over said lead-in mechanism to a position over said assembly mechanism; means on said stabilizing shuttle carrier slidably to engage said shuttle head when protracted and thereby stabilize said shuttle head; an assembly table carried by said assembly mechanism, upon which a plurality of strips of the ribbon are joined to make the fabric; and, a movable stitcher mechanism cycled to follow the abutting edges of contiguous strips of the ribbon in order to stitch them together.

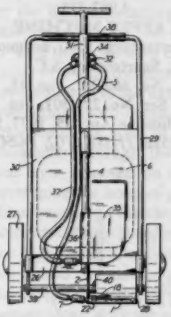
4,087,309

APPARATUS FOR SEALING LAP JOINTS OF FUSIBLE ROOFING SHEETS

John N. Lang, 46 Allpark Ave., Pittsburgh, Pa. 15216

Filed Mar. 10, 1977, Ser. No. 776,301
Int. Cl.[2] B32B *31/26;* B65H *69/08*
U.S. Cl. 156—497 **12 Claims**

1. Apparatus for sealing lap joints of fusible roofing sheets, said apparatus comprising a burner having substantially flat upper and lower walls connected by side walls and a front end wall, the burner having a fuel inlet and an open rear end, a conduit for connecting said inlet to a fuel source, and means connected to one side of the burner for inserting it between the overlapping layers of a lap joint and for sliding it forward



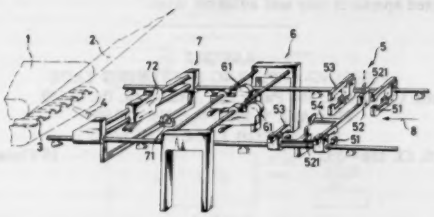
along the joint while flame heats said upper and lower walls and issues from the rear end of the burner to fuse said overlapping layers together, said fuel inlet being located in the front end of the bruner side wall at said one side of the burner.

4,087,310

DEVICE FOR INTERCONNECTING PLATES TO BE COVERED BY FOAMED MATERIAL

Horst Schmidt, Siegen, Germany, assignor to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Division of Ser. No. 546,792, Feb. 3, 1975, abandoned. This application Dec. 20, 1976, Ser. No. 752,063
Claims priority, application Germany, Feb. 1, 1974, 2404723
Int. Cl.[2] B32B *3/22*
U.S. Cl. 156—505 **6 Claims**



1. A device for interconnecting longitudinally profiled plates to be covered by foamed material to form a continuous cover layer, which includes in combination a clamping carriage displaceable along a desired path of movement of the plates to be interconnected, said path being substantially parallel to the longitudinal extension of said plates to be interconnected, clamping means forming part of said clamping carriage and movable toward and away from each other and arrestable relative to each other for receiving and clamping therein one end of one longitudinally profiled plate and the start of the next following longitudinally profiled plate, spacer means forming part of said clamping carriage and operable to move between two successive serially arranged plates to space the same from each other, first adhesive tape applying means spaced from said clamping carriage in the direction in which said carriage is movable along said path, said first adhesive tape applying means being operable to apply adhesive tape means to respective adjacent successive plates in a direction only transverse to said path and along the spacing between the respective two successive plates, and second adhesive tape applying means arranged between and in spaced relationship to both said clamping carriage and said first adhesive tape applying means

and operable to apply adhesive tape means to successive plates only in the path longitudinal direction thereof and across the spacing therebetween.

4,087,311

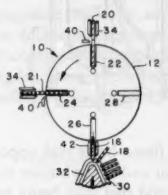
CARPET MACHINE

Don M. Bylund, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Continuation of Ser. No. 369,081, Jun. 11, 1973, abandoned, which is a division of Ser. No. 221,301, Jan. 27, 1972, Pat. No. 3,840,413. This application Apr. 25, 1977, Ser. No. 790,254

Int. Cl.[2] B32B *31/00, 5/02;* **D05C** *17/02*

U.S. Cl. 156—511 **7 Claims**



1. Apparatus to manufacture a cut, pile fabric comprising: an elongated rotatably mounted member, means forming rows of apertures in said elongated member with at least four apertures in each row, a first yarn supply means located adjacent said elongated member to supply yarn into one of said apertures in each of said rows of apertures at a preselected time, a second yarn supply means located adjacent said elongated member to supply yarn into another of said apertures in each of said rows of apertures at a preselected time, means operably associated with said elongated member and located adjacent at least two of said apertures to sever the yarn supplied into said apertures, means mounting an adhesive layer adjacent said elongated member and means to insert severed yarn from certain preselected apertures into said adhesive layer.

4,087,312

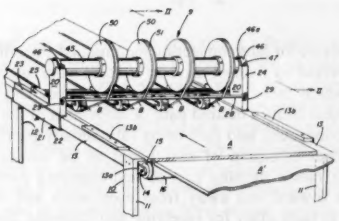
FEEDING-APPLYING LETTERING TAPE

Peter C. Maltese, 156 Paree Dr., Pittsburgh, Pa. 15239

Filed Aug. 1, 1977, Ser. No. 820,909

Int. Cl.[2] B32B *31/04;* **B31F** *5/00*

U.S. Cl. 156—552 **15 Claims**



1. In an apparatus for feeding and applying lettering tape and the like to a face of a substantially planar sign panel wherein a panel to which the tape is to be applied is progressively advanced on a forwardly moving table-like conveyor having a pair of opposed side rails therealong, the improvement involving a tape feed and applicating assembly mounted on the side rails and adapted to project outwardly therefrom above a sign panel being advanced forwardly on the conveyor, said assembly comprising: a pair of guide rails adapted to be mounted on the opposed side rails of the conveyor, a transversely extending primary shaft and a transversely extending secondary shaft, side-positioned stand means on said guide rails for carrying said primary shaft in a cross-extending relation therebetween and for carrying said secondary shaft in a cross-extending relation therebetween forwardly of said primary shaft, at least one feeder reel for tape having a pressure-sensitive adhesive side, said feeder reel being rotatably carried by said primary shaft, at least one applicator arm swingably carried by said secondary shaft in an aligned cooperating relation with respect to said feeder reel for guidably receiving and directing the pressure-sensitive side of a forward end portion of the tape into engagement with an outer face of the panel being advanced forwardly along the conveyor, a cross-extending member secured at its ends on said stand means between said primary and secondary shafts, spring means positioned between said applicator arm and said cross-extending member for spring-loading said arm, said applicator arm having a pressure wheel rotatably carried thereby to engage on an outer side of pressure-sensitive tape being supplied from said feeder reel to press its pressure-sensitive side upon the outer face of the advancing panel with a pressure controlled by said spring, whereby successive length portions of the tape will be applied to and advanced with the panel.

4,087,313

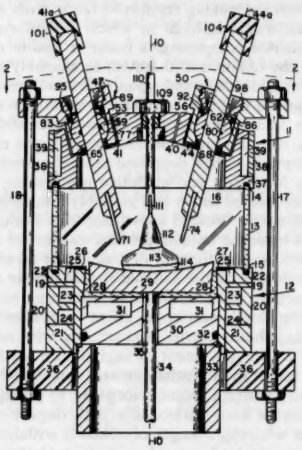
PROCESS AND APPARATUS FOR PREPARATION OF SINGLE CRYSTALS AND TEXTURED POLYCRYSTALS

Joseph Beril Milstein, 12109 Greenleaf Ave., Potomac, Md. 20854

Filed Nov. 28, 1975, Ser. No. 635,421

Int. Cl.[2] B01J *17/18*

U.S. Cl. 156—602 **2 Claims**



1. In a method of growing crystals of intermetallic compounds having a first element R and a second element T, wherein R is a metal selected from the group consisting of the lanthanide rare earth metals and yttrium, and T is a metal selected from the group consisting of iron, cobalt and nickel, or alloys of said compounds, having mosaic spread of not more than three tenths of a degree, measured by standard neutron diffraction methods, of the type wherein:

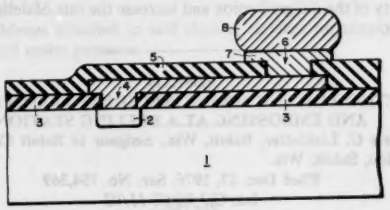
material is placed in an electrically conductive hearth, the material is then partially melted by the action of a plurality of electric arcs and plasma associated with each such arc to produce a molten region contained by the solid portion of said material, and then growing a crystal by controlled withdrawal of material from the molten region, wherein the improvement comprises:

causing the solid portion of said material to be physically rotated relative to the said electric arcs in a manner such that the action of the arcs removes dross from the surface of the molten region, during the crystal growth process.

4,087,314
BONDING PEDESTALS FOR SEMICONDUCTOR DEVICES

William L. George, Scottsdale, and Richard W. Wilson, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 13, 1976, Ser. No. 723,006
Int. Cl.[2] C23F *1/02*
U.S. Cl. 156—643 6 Claims



1. A process for the formation of a bonding pedestal for a multileaded semiconductor device having aluminum or an aluminum alloy on-chip metallization covered with a passivating glass with vias exposing portions of said metallization therethrough, comprising:

sputtering depositing a thin layer consisting of a mixture of Ti—W over the on-chip metallization;

sputtering depositing a thin layer of a third metal suitable as a plating base over said Ti—W layer;

selectively plating a thick layer of a metal selected from the group consisting of Ni, Cu, Ag, and Au over portions of said third metal over said vias but said thick layer not subtending all of said on-chip metallization;

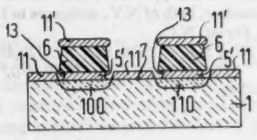
removing said third metal in areas where the thick layer was not plated; and

etching said Ti—W layer in areas where the thick layer was not plated in an etchant which has an extremely slow attack rate of said on-chip metallization.

4,087,315
METHOD FOR PRODUCING LIGHT CONDUCTOR STRUCTURES WITH INTERLYING ELECTRODES

Franz Auracher, Munich, and Guido Bell, Gilching, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jun. 8, 1977, Ser. No. 804,570
Claims priority, application Germany, Jun. 14, 1976, 2626563
Int. Cl.[2] G02B *5/23*
U.S. Cl. 156—656 9 Claims

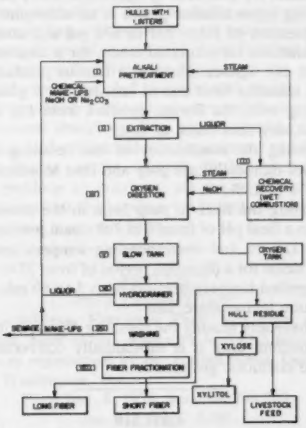


1. A method for the production of a light conducting structure having a pair of light conductors embedded in one surface of a substrate of an electro-optical material having a *c*-axis extending parallel to the surface and at right angles to the light conductors and having an electrode extending between the light conductors, said structure being particularly adapted for use as an electrically controllable coupler, said method comprising the steps of providing a substrate of the electro-optical material having said one surface; covering zones of said surface of the substrate, which zones lie adjacent to second zones of the surface in which the light conductors are to be formed, with a layer of polycrystalline silicon so the second zones are free of the silicon layer; applying a layer of diffusion material on the silicon layer and the second zones of the said one surface of the substrate; diffusing the diffusion material into the surface of the substrate at said silicon-free second zones to form light conductors having an index of refraction greater than the index of refraction of the substrate by heating the structure to an elevated temperature; cooling the substrate; applying a layer of chromium to cover the light conductors and the undiffused layer of diffusion material; removing the layer of polycrystalline silicon together with those portions of the diffusion material and chromium layer arranged thereupon to expose said one surface of the substrate adjacent to the light conductors; applying a layer of positive-acting photo-lacquer on said one surface and the remaining portion of the layer of chromium; exposing the layer of photo-lacquer through the substrate with the remaining chromium layer disposed on the light conductors acting as a mask; developing the layer of photo-lacquer so that the unexposed portions remain on the chromium layers covering the light conductors and the exposed portions are removed from said one surface of the substrate; applying a metal layer to the exposed portions of said one surface of the substrate with the remaining photo-lacquer acting as a mask; removing the remaining photo-lacquer along with the metal layer deposited thereon; and then etching the chromium layers from the light conductors.

4,087,316
PROCESS FOR OBTAINING SEED HULL COMMODITIES INCLUDING CELLULOSIC FIBERS AND XYLITOL

Gay M. Jividen, Raleigh, N.C.; Hou-Min Chang, Bellevue, Wash.; R. Heath Reeves, and Chen-Loung Chen, both of Raleigh, N.C., assignors to Cotton Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 609,679, Sep. 2, 1975, abandoned. This application Sep. 15, 1976, Ser. No. 723,625
Int. Cl.[2] D21C *9/08, 5/00, 3/02*
U.S. Cl. 162—14 16 Claims



1. A process for removing cellulosic fibers from uncut and once cut seed hulls having thereon linter fibers of from about 5 to about 15 millimeters in length and embedded hull fibers of from about 1.5 to about 5 millimeters in length, which comprises (a) in the absence of mechanical action sufficient to cause degradation of fiber properties, contacting at least one member selected from the group consisting of uncut and once cut seed hulls which member comprises both cellulosic fibers and non-fibrous hull components with an alkaline solution and oxygen-containing gas until the cellulosic fibers are substantially free of the non-fibrous hull components, and (b) recovering the free cellulosic fibers from the non-fibrous hull components so as to produce readily washable cellulosic fibers having substantially

unimpaired mechanical properties, said cellulosic fibers comprising (i) linter fibers of from about 5 to about 15 millimeters in length and (ii) hull fibers of from about 1.5 to about 5 millimeters in length.

6. A process for obtaining xylose and readily usable cellulosic fibers from uncut and once cut seed hulls having thereon linter fibers of from about 5 to 15 millimeters in length and embedded hull fibers of from about 1.5 to about 5 millimeters in length, which process comprises: (a) in the absence of mechanical action sufficient to cause degredation of fiber properties, contacting at least one member selected from the group consisting of uncut and once cut seed hulls which member comprises both cellulosic fibers and non-fibrous hull components with an alkaline solution and oxygen gas at a concentration and temperature and for a time sufficient to remove polyphenolic materials and coloring substances but not appreciable xylan from the seed hulls and to soften the seed hulls and render fibers substantially free from the hulls and insufficient to remove appreciable xylan from the hulls; (b) separating said softened cottonseed hulls and fibers so as to produce (1) essentially clean cellulosic fibers and (2) hull residue comprising xylan, the hull residue being essentially free of polyphenolic materials and coloring substances and essentially free of hull fibers; and (c) hydrolyzing the xylan-containing hull residue to convert xylan to xylose and produce a xylose hydrolyzate solution.

4,087,317

HIGH YIELD, LOW COST CELLULOSIC PULP AND HYDRATED GELS THEREFROM

James R. Roberts, Sao Paulo, Brazil, assignor to Eucatex S.A. Industria e Comercio, Sao Paulo, Brazil

Filed Aug. 4, 1975, Ser. No. 601,419
Int. Cl.[2] D21B *1/12, 1/16;* D21C *3/02*
U.S. Cl. 162—23 **7 Claims**

1. The process of making high yield low cost cellulosic pulp which comprises:

(a) mechanically defiberizing lignocellulose by mechanically abrading lignocellulose pieces in an atmosphere of steam at a pressure of from 100 to 170 psi and corresponding temperatures for saturated steam for a time sufficient to reduce the lignocellulose to a fibrous product having a Clark classifier fiber size of less than 10% plus 12 mesh,

(b) mixing with the fibrous product from 1% to 20% by weight, dry fiber basis, of lime,

(c) adjusting the consistency of the resulting mixture of aqueous lignocellulosic pulp and lime to a consistency of from 10 to 25%,

(d) digesting the fiber to pulp form in the presence of the lime to a final pH of from 6 to 8 at steam pressures of from 75 to 125 psi and corresponding temperatures for saturated steam for a digestion period of from 30 to 90 minutes to digestion temperature and from 5 to 60 minutes at said digestion temperature, and

(e) mechanically beating the resulting digested fiber in aqueous medium until it is substantially converted to a hydrated cellulosic gel product.

4,087,318

OXYGEN-ALKALI DELIGNIFICATION OF LIGNOCELLULOSIC MATERIAL IN THE PRESENCE OF A MANGANESE COMPOUND

Hans Olof Samuelson, and Kjell Evert Abrahamsson, both of Gothenburg, Sweden, assignors to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Continuation-in-part of Ser. No. 555,755, Mar. 6, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,717
Claims priority, application Sweden, Mar. 14, 1974, 7403451
Int. Cl.[2] D21C *1/00, 3/02, 3/04*
U.S. Cl. 162—60 **22 Claims**

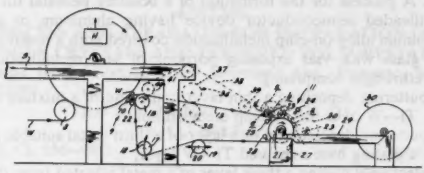
1. A process for the delignifcation of raw lignocellulosic material to produce cellulose pulp having a higher viscosity at a given Kappa number which comprises pretreating said lignocellulosic material with a liquid selected from the group consisting of water and aqueous solutions to remove from the lignocellulosic material metal ions and compounds which catalyze the degradation of carbohydrates, and then carrying out the delignification with oxygen and alkali at a pH within the range from about 7 to about 10 in the presence of a catalytically-active manganese compound added in an amount within the range from 0.01 to about 1% by weight Mn based on the dry weight of the lignocellulosic material to improve the selectivity of the delignification and increase the rate of delignification.

4,087,319

METHOD OF AND MEANS FOR SHEET TRANSFER TO AND EMBOSSING AT A REELING STATION

Merle G. Linkletter, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Dec. 27, 1976, Ser. No. 754,369
Int. Cl.[2] B31C *11/02*
U.S. Cl. 162—113 **33 Claims**



9. A method of transferring a continuously advancing tissue paper web from creping means to a reeling station, comprising:

separating the web from the creping means;

continuously transporting the web on a conveyor and embossing belt to the reeling station;

winding the continuously advancing web into a parent roll at the reeling station;

and pressing said parent roll against the continuously advancing web supported on the conveyor belt and thereby embossing the web.

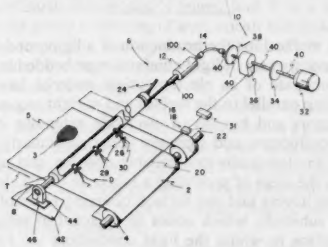
11. A method according to claim 9, comprising effecting additional embossing at an intermediate position along said conveyor run between the creping means and the reeling station.

4,087,320

APPARATUS FOR CLEANING AN ENDLESS BELT HAVING AN AFFIXED SIGNAL ELEMENT

Thomas Michael Danahy, Niskayuna, and Joseph Anthony Kilroy, Rensselaer, both of N.Y., assignors to Huyck Corporation, Wake Forest, N.C.

Filed Sep. 3, 1976, Ser. No. 720,469
Int. Cl.[2] D21F *1/32;* B08B *3/02*
U.S. Cl. 162—252 **15 Claims**



1. An apparatus including,

(A) An endless belt comprising a signal element affixed

thereto for identifying one complete revolution of said belt;

(B) A shower element;

(C) Means interconnected with said shower element for moving said shower element a predetermined transverse distance relative to the width of said belt upon actuation;

(D) A sensing element interconnected with said moving means for actuating said moving means in response to one complete revolution of said signal element affixed to said belt; and,

(E) Means attached to said shower element for supplying fluid under pressure.

4,087,321

HEAD BOX HAVING DISTRIBUTOR PIPE CONNECTED TO A PULP GUIDE BLOCK

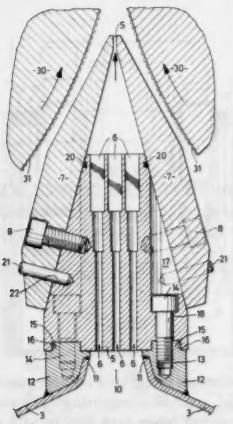
Hans-Joachim Schultz, and Wolf-Gunter Stotz, both of Ravensburg, Germany, assignors to Escher Wyss GmbH, Ravensburg, Germany

Filed Dec. 20, 1976, Ser. No. 752,092

Claims priority, application Switzerland, Jan. 23, 1976, 817/76

Int. Cl.[2] D21F *1/02, 1/06*

U.S. Cl. 162—343 **5 Claims**



1. A head box for a paper making machine comprising

a distributor for receiving a flow of pulp, said distributor having a distribution pipe of narrowing circular cross-section in the direction of flow of the pulp and means defining an elongated aperture in said distribution pipe extending longitudinally of said pipe;

a pulp guide for uniformly distributing the flow of pulp from said distributor, said pulp guide being mounted over said aperture of said distribution pipe to hold said pipe together along said aperture and being a metal block having a plurality of ducts extending therethrough for passage of pulp from said distribution pipe;

a connection between said pipe and said block on each longitudinal side of said aperture to receive a peripherally operative tangential force of said pipe; and

a pair of plates releaseably secured on said pulp guide in spaced apart relation to define a throat for receiving a uniform flow of pulp from said pulp guide for distribution onto at least one wire.

4,087,322

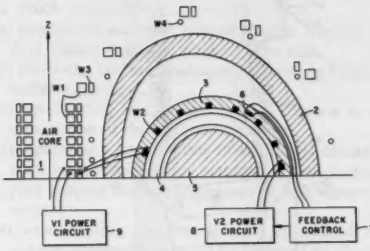
AIR CORE POLOIDAL MAGNETIC FIELD SYSTEM FOR A TOROIDAL PLASMA PRODUCING DEVICE

Frederick B. Marcus, Clinton, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 7, 1976, Ser. No. 720,864

Int. Cl.[2] G21B *1/00;* **H01J** *7/24*

U.S. Cl. 176—3 **3 Claims**



1. In a toroidal plasma confinement device having poloidal and toroidal magnetic fields for confining a toroidal plasma column with a plasma current induced therein along a circular equilibrium axis in a torus vacuum cavity, said poloidal magnetic field being provided by an air core primary magnetic winding, said device further including a plurality of toroidal field coils encompassing said plasma current for providing said toroidal magnetic field, the improvement comprising a magnetic shield winding positioned between the said toroidal field coils and said plasma current, a magnetic decoupling winding wound adjacent to said air core winding, said shield winding having an equal but opposite number of turns as said decoupling winding, a first power circuit, said primary winding being connected in series with said first power circuit, a second power circuit, said shield winding being connected in series with said decoupling winding and to said second power circuit, sensing means mounted near to said plasma current for sensing the plasma current flux from the vacuum cavity, and a feedback control circuit coupled between said sensing means and said second power circuit to thereby control the current to said series connected shield winding and decoupling winding to thus maintain said total shield winding current equal and opposite to said plasma current, whereby during operation of said device to produce an energetic plasma within said vacuum cavity, said toroidal field coils are substantially shielded from any stray pulsed magnetic fields.

4,087,323

PIPE CONNECTOR

Thomas E. Sullivan, Evergreen Park, and John A. Pardini, Brookfield, both of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

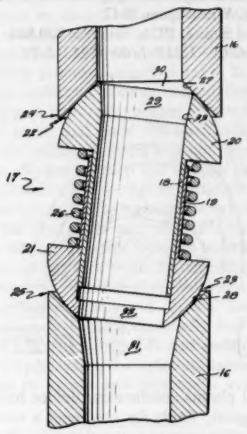
Filed Dec. 9, 1976, Ser. No. 749,206

Int. Cl.[2] G21C *9/00*

U.S. Cl. 176—38 **2 Claims**

2. In a liquid-metal-cooled safety test facility including a tank containing said liquid metal, a reactor vessel containing a nuclear reactor core, at least one pump and at least one exchanger submerged in said liquid metal and being connected by lines carrying said liquid-metal coolant, the improvement comprising an expansion/deflection coupling in a line having conical sockets in the ends thereof between components of the facility comprising a pair of coaxially and slidably engaged tubular elements having substantially the same diameter throughout the length thereof and radially enlarged ball portions of spherical contour, said ball portions being adapted to engage said conical sockets in the ends of the lines being connected, the inner diameter of the lines being connected is

substantially equal to the internal diameter of the coupling, said conical sockets being formed by frustoconical interior surfaces at the end of the lines which flare outward at an angle of 45° to the axis of the lines, a flared inlet throat in the coupling being



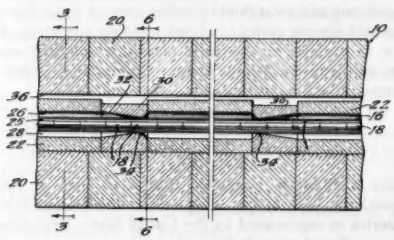
larger than an outlet throat in the line, and a flared inlet throat in the line being larger than an outlet throat in the coupler, and spring means for urging said spherical portions apart and into engagement with said conical sockets.

4,087,324

PILE CONSTRUCTION

Alfred A. Johnson, Claymont, and John T. Carleton, Elsmere, both of Del., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 30, 1951, Ser. No. 253,908
Int. Cl.² G21C *5/02*
U.S. Cl. 176—52 **1 Claim**



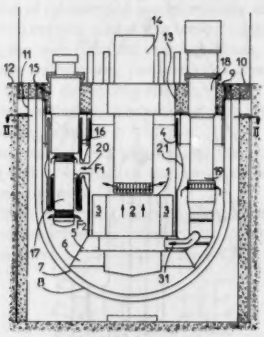
1. A neutronic reactor comprising a first plurality of solid graphite blocks extending in one direction and arranged in vertically spaced horizontal layers, a second plurality of solid graphite blocks arranged in horizontal rows transverse to the first plurality of solid graphite blocks and serving to space the layers thereof from one another, apertured tube-bearing graphite blocks arranged in horizontal rows in the spaces between the rows of the second plurality of solid blocks and being of smaller cross-sectional dimensions than the second plurality of blocks so as to be spaced on at least two sides from the first and second pluralities of blocks, graphite support blocks located in the same horizontal rows as the tube-bearing blocks so as to alternate therewith and being of smaller cross-sectional dimensions than the tube-bearing blocks so as to be spaced on at least two sides from the first and second pluralities of blocks, tubes for cooling water extending through the apertures in the tube-bearing and support blocks, the aperture of each support block being tapered so as to provide the tube extending therethrough with a narrow region of support while being elsewhere spaced therefrom, the aperture of each tube-bearing block being larger than the tube extending therethrough so as to be everywhere spaced from said tube, and bodies of thermal-neutron-fissionable material disposed within the tubes, helium being provided in the spaces between the tubes and the apertures in the tube-bearing blocks and support blocks.

4,087,325

NUCLEAR REACTOR

René Chevallier, Grenoble, and Michel Sauvage, Aix-en-Provence, both of France, assignors to Societe Generale de Constructions Electriques et Mecaniques Alsthom S.A. and Commissariat a l'Energie Atomique, both of Paris Cedex, France

Filed Dec. 29, 1976, Ser. No. 755,318
Claims priority, application France, Dec. 29, 1975, 75 39982; Nov. 25, 1976, 76 35513
Int. Cl.² G21C *15/00*
U.S. Cl. 176—65 **10 Claims**



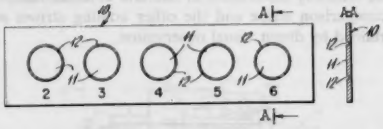
1. In combination: an integrated nuclear reactor cooled by a liquid metal, said reactor comprising: a main tank holding liquid metal, a central inner tank within said main tank, and containing the reactor core, and individual cylindrical chambers within said main tank and circumferentially positioned about said inner tank, each chamber housing a liquid metal heat exchanger, the surfaces of the inner tank and of said cylindrical chambers bulging outwardly and neck portions directly interconnecting the inner tank to the cylindrical chambers at said bulges and forming supply orifices for the flow of liquid metal heated by said nuclear reactor core to said heat exchangers for cooling thereof with said neck portions causing said inner tank to directly support said cylindrical chambers and unitary thermal protection means for said inner tank and said individual cylindrical chambers and extending the length of those portions of said inner tank and said cylindrical chambers immersed within the liquid metal and about said inner tank and said cylindrical chambers at the level of said neck portions for maintaining the neck portions and the adjacent portions of said chambers and said inner tank at generally the same temperature to prevent thermal stress at the connections between the inner tank and the cylindrical chambers as defined by said neck portions.

4,087,326

MICROBIOLOGICAL SCALED STERILITY TEST STRIPS AND METHOD

Karl Kereluk, Basking Ridge, N.J., assignor to Ethicon, Inc., Somerville, N.J.

Filed May 3, 1976, Ser. No. 682,009
Int. Cl.[2] C12K *1/00*
U.S. Cl. 195—103.5 R 10 Claims



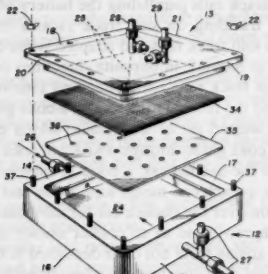
1. A method for providing a permanent record of the effectiveness of a sterilizing cycle which comprises (a) providing a sterility test strip comprising a single carrier having a plurality of individual microorganism colony sites defined on the surface thereof, each of said sites containing a different population of microorganisms, (b) exposing said sterility test strip to the sterilizing cycle and (c) incubating said colony sites on said exposed test strip in a common culture medium containing a viable microorganism color indicator whereby the effectiveness of the sterilizing cycle is indicated by the degree of color development on the individual microorganism colony sites.

4,087,327

MAMMALION CELL CULTURE PROCESS

Joseph Feder; Katharine Ku, both of University City, and Mau-Jung Kuo, Creve Coeur, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Apr. 12, 1976, Ser. No. 676,100
Int. Cl.[2] C12K *9/00;* C12B *1/10*
U.S. Cl. 195—1.7 6 Claims



1. In the method of culturing mammalian cells in vitro whereby the cell growth attaches onto a plurality of elongate fibers disposed in a cell culture reactor having culture medium inlet and outlet means, the improvement comprising employing said fibers in a shallow layer configuration and distributing the culture medium with distributor plate means in a flow path substantially uniformly through said fiber layer and substantially, transverse to the plane of the elongate axes of said fibers.

4,087,328

PURIFICATION AND IMMOBILIZATION OF SULFHYDRYL OXIDASE

Harold E. Swaisgood, Raleigh, N.C., assignor to Research Triangle Institute, Reasearch Triangle Park, N.C.

Filed Oct. 10, 1975, Ser. No. 621,630
The portion of the term of this patent subsequent to Oct. 11, 1994, has been disclaimed.
Int. Cl.[2] C12D *13/10;* C07G *7/02;* A23C *3/02, 9/12*
U.S. Cl. 195—63 8 Claims

1. A process for isolating sulfhydryl oxidase enzyme from milk which comprises:

(a) precipitating a crude impure enzyme fraction of sulfhydryl oxidase from the whey of skim milk;

(b) dissolving said impure enzyme fraction in a dilute neutral buffer solution;

(c) equilibrating said impure enzyme fraction to allow for dissociation of the sulfhydryl oxidase;

(d) separating a first fraction of sulfhydryl oxidase enzyme from molecularly larger materials by subjecting the impure enzyme fraction from step (c) to a separation treatment;

(e) concentrating the first fraction of sulfhydryl oxidase enzyme obtained in step (d) by means of an ultrafilter, dry molecular sieves or vacuum evaporation to obtain a second fraction of sulfhydryl oxidase enzyme; and

(f) separating said second fraction of sulfhydryl oxidase to remove molecularly smaller materials and isolating the sulfhydryl oxidase enzyme therefrom said sulfhydryl oxidase having a specific activity at least 50 times greater than that of the crude impure enzyme fraction obtained in step (a).

4,087,329

CREATININE DESIMIDASE AND ITS METHOD OF PRODUCTION

Osamu Terada, and Takayuki Uwajima, both of Machida, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Aug. 3, 1976, Ser. No. 711,207
Claims priority, application Japan, Aug. 28, 1975, 50-103473; Sep. 11, 1975, 50-109452
Int. Cl.[2] C12D *13/10*
U.S. Cl. 195—66 R 7 Claims

1. A process for producing creatinine desimidase which comprises culturing a creatinine desimidase producing microorganism belonging to the genus *Brevibacterium, Corynebacterium, Pseudomonas* or *Arthrobacter* in a nutrient medium until creatinine desimidase is detected in the culture, and thereafter isolating said creatinine desimidase.

4,087,330

IMMOBILIZATION OF ENZYMES USING RECYCLED SUPPORT MATERIALS

Jerry L. Gregory, Painted Post, and Wayne H. Pitcher, Jr., Big Flats, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 597,012, Jul. 18, 1975, Pat. No. 4,002,576. This application Dec. 23, 1976, Ser. No. 754,075
The portion of the term of this patent subsequent to Jul. 18, 1992, has been disclaimed.
Int. Cl.[2] C07G *7/02*
U.S. Cl. 426—68 6 Claims

1. A method of preparing an immobilized enzyme composite comprising enzymes bonded to porous, high surface area, insoluble support materials, the method comprising the steps of:

a. reacting, with an aqueous solution of NaOCl, a spent immobilized enzyme composite comprising a porous, high surface area, insoluble inorganic support material having associated therewith contaminants resulting from use of the composite, the reaction being under conditions suffi-

cient to cause the removal of substantially all such contaminants and to result in a reuseable enzyme support material; and

B. reacting the reuseable enzyme support material of step (A) with an aqueous solution of active enzymes under conditions sufficient to bond at least some active enzymes onto the surface of the support.

4,087,331
COLORIMETRIC METHOD FOR DETERMINING GAMMA-GLUTAMYL TRANSPEPTIDASE AND COMPOSITIONS USEFUL THEREIN

Giovanni Bucolo, Hialeah; Mathew M. Madappally, Cooper City, and Gerald E. Jaffe, Miami, all of Fla., assignors to Coulter Electronics, Inc., Hialeah, Fla.

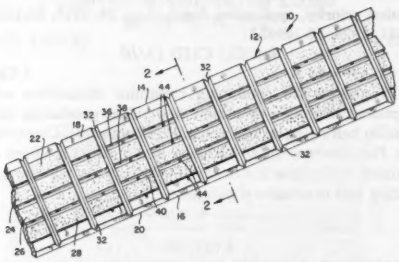
Filed Jan. 12, 1977, Ser. No. 758,800
Int. Cl.² G01N *33/00, 31/14*
U.S. Cl. 195—99 **9 Claims**

1. In a colorimetric method for the determination of gamma-glutamyl transpeptidase enzyme activity in a biological fluid, wherein said enzyme in said fluid is reacted catalytically with a substrate of a synthetic peptide of L-glutamic acid in aqueous medium to yield a diazotizable cleavage product of the peptide and the cleavage product is diazotized and reacted with a coupling compound to produce a dye having a color intensity proportional to the enzyme activity, the improvement which comprises employing as said substrate a water-soluble salt of a compound selected from the group consisting of L-gamma-glutamyl-3-sulfoanilide and L-gamma-glutamyl-4-sulfoanilide.

4,087,332
INDICATOR FOR USE IN SELECTION OF BACTERICIDAL AND BACTERISTATIC DRUGS AND METHOD FOR PRODUCING SAME

Kai Aage Hansen, Villavej 13, 9240 Nibe, Denmark

Continuation-in-part of Ser. No. 684,240, May 7, 1976, abandoned. This application Jul. 22, 1977, Ser. No. 818,075
Int. Cl.² C12K *1/00*
U.S. Cl. 195—127 **12 Claims**

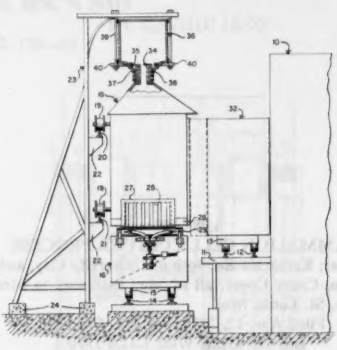


1. An indicator for use in the selection of bactericidal and bacteristatic drugs, comprising a solid elongated carrier sheet having an upper layer with a porous front surface and a moisture-tight backing, said upper layer being made of heat or pressure sensitive material that has interconnected passages pervious to moisture and being of a material consistency that permits said passages to be closed solely by application of heat or pressure without application of any additional moisture-sealing material, a plurality of testing coatings arranged on said front surface in spaced relationship to each other, said testing coatings comprising a plurality of spaced stripes on said porous front surface and extending parallel to the longitudinal axis of said carrier sheet, one of said coating stripes consisting only of a nutrition substrate for bacteria and constituting a comparison stripe, the other coating stripes constituting a mixture of a nutrition substrate and a different bactericidal or bacteristatic drug, and a moisture barrier band consisting of said passages that have been closed between each adjacent pair of said coating stripes formed by the application of heat or pressure to the front surface of said carrier sheet, said carrier sheet comprising a continuous length of adsorbent or absorbent sheet material with said porous front surface serving as an integral mechanical carrier for said testing coatings, said carrier sheet being adapted to be separated transversely at even intervals into small transverse panels, each containing said coating stripes, the coating stripe sections on said panels, when impregnated by a testing specimen, serving as individual bacteria culture media, whereby differences in bacteria colonization between the comparison stripe and the other coating stripes may be ascertained by direct visual observation.

4,087,333
TRAVELING HOOD FOR COKE OVEN EMISSION CONTROL

Roy Naevestad, Fanwood, N.J., assignor to Wilputte Corporation, New Providence, N.J.

Filed May 27, 1976, Ser. No. 690,415
Int. Cl.² C10B *27/00, 39/00*
U.S. Cl. 202—227 **2 Claims**



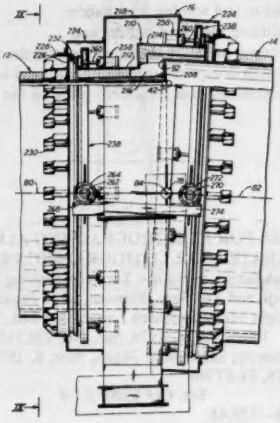
1. In a system for pushing coke from a battery of coke ovens comprising track rails paralleling the battery of coke ovens, a quench car traveling on said track rails, a locomotive also traveling on said track rails and adapted when coupled to said quench car to move it in opposite directions on said track, a second set of track rails paralleling and intervening between the ovens and the first said track rails, a coke guide car traveling on said second set of track rails, which coke guide car comprises a coke guide through which hot coke is pushed from an oven into the quench car, a hood of substantially the same length as the quench car, means supporting said hood in superposed relation over the quench car for movement into vertical alignment therewith so as to collect smoke, gas, fumes and particulates arising from hot coke deposited in the quench car, and an exhaust duct coextensive in length with said battery of coke ovens by which duct smoke, gas, fumes and particulates collected in said hood are carried away from said hood, the improvement comprising a member at each of the opposite ends of said quench car movable from a lower position, in which the quench car may pass under the hood, to a raised position in which the member contacts the end of the hood to exert a pushing force thereon to move the hood concurrently with the quench car, separate fluid power means for each of said members to effect raising and lowering thereof, and means for selectively controlling the said fluid power means.

4,087,334

SEAL ARRANGEMENT FOR A ROTARY DRUM ASSEMBLY

Richard Francis Harig, Littleton, Colo.; Arthur Jacob Pietrusza, McMurray, Pa.; Albert Harry Riebel, Jr., Pittsburgh, PA, and Harry James Kent, Pittsburgh, PA, assignors to Dravo Corporation, Pittsburgh, Pa.

Filed Oct. 4, 1976, Ser. No. 729,077
Int. Cl.[2] C10B *1/10, 29/04, 45/00;* F27B *77/24*
U.S. Cl. 202—269 16 Claims



1. A rotary drum assembly comprising,

a first cylindrical drum member having an inlet portion for receiving materials to be treated and an outlet portion for discharging the treated materials,

a second cylindrical drum member having an inlet portion for receiving materials from said first drum member and a discharge portion for discharging further treated materials from said second drum member, said first drum member outlet portion extending into said second drum member inlet portion,

an annular support member extending around said first drum member outlet portion and said second drum member inlet portion,

an annular ring member secured to said first drum member outlet portion adjacent to said annular support member,

sealing means connected to said annular support member and said first and second drum members for maintaining a fluid-tight seal between said first and second drum members,

said sealing means having a first annular seal portion and a second annular seal portion,

said first annular seal portion secured to said annular ring member and having an annular sealing surface,

said second annular seal portion movably supported by said annular support member and having an annular sealing surface in abutting relation with said first annular seal portion annular sealing surface to form a first seal betwen said first drum member and said annular support member, and

said sealing means being operable to maintain a fluid-tight seal between said first and second drum members upon axial movement of either of said first and second drum members relative to said annular support member.

4,087,335

INHIBITORS FOR VINYLBENZYL CHLORIDE AND VINYLTOLUENE DECOMPOSITION

Allen P. Marks, Holland, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 615,146, Sep. 19, 1975, abandoned. This application May 5, 1977, Ser. No. 793,981
Int. Cl.[2] B01D *3/34;* C07C *25/14, 15/02*
U.S. Cl. 203—6 10 Claims

1. A method for stabilizing a compound selected from vinylbenzyl chloride and vinyltoluene against violent decomposition in the presence of iron and chlorine at ambient and above ambient temperatures, which comprises contacting said compound with an amount of a Lewis base selected from cyclic and acyclic amides and sulfoxides sufficient to inhibit said violent decomposition thereof during the preparation, purification or storage of said vinylbenzyl chloride or vinyltoluene.

4,087,336

ELECTROLYTIC REDUCTIVE COUPLING OF HYDROXYBENZALDEHYDES

John H. Wagenknecht, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 27, 1976, Ser. No. 754,649
Int. Cl.[2] C25B *3/04, 3/10;* C07C *31/20, 39/00*
U.S. Cl. 204—75 13 Claims

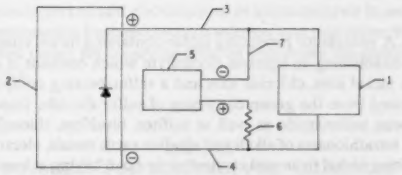
1. A process for electrolytic reductive coupling of hydroxybenzaldehydes which comprises electrolytic reduction at the cathode in an undivided cell fitted with a steel anode by electrolysis in an aqueous alkaline electrolysis medium comprising such hydroxybenzaldehyde, base, and aqueous solvent, and thereafter recovering a 1,2-bis(hydroxyaryl)ethane-1,2-diol product.

4,087,337

REJUVENATION OF THE EFFICIENCY OF SEA WATER ELECTROLYSIS CELLS BY PERIODIC REMOVAL OF ANODIC DEPOSITS

John E. Bennett, Painesville, Ohio, assignor to Diamond Shamrock Corporation, Cleveland, Ohio

Filed May 25, 1977, Ser. No. 800,402
Int. Cl.[2] C25B *1/24, 15/02*
U.S. Cl. 204—95 5 Claims



1. A method of removing mineral deposits from electrodes, at least one of said electrodes is a dimensionally stable anode, in an electrolysis cell comprising operating the electrolysis cell at a current density of at least 0.2 amps per square inch until there is a reduction in cell efficiency, briefly reversing the cell polarity at reduced current densities of less than about 50 milliamps per square inch for a period of time sufficient to remove interfering mineral deposits and thereafter operating the electrolysis cell normally by reversing polarity and operating at current densities of at least about 0.2 amps per square inch.

4,087,338

ELECTROWINNING OF NICKEL IN DIAPHRAGM-FREE CELLS

Aubrey Stewart Gendron, Walden; John Ambrose, Oakville, and Victor Alexander Ettel, Mississauga, all of Canada, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Feb. 22, 1977, Ser. No. 770,472
Claims priority, application Canada, May 27, 1976, 253463
Int. Cl.[2] C25C *1/08*
U.S. Cl. 204—112 4 Claims

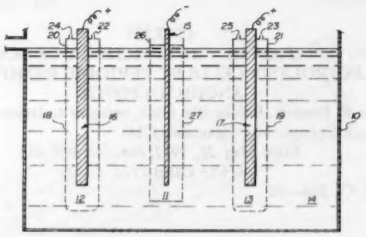
1. A process for electrowinning nickel from a chloride-free nickel-containing electrolyte in a diaphragm-free cell, wherein the electrolyte comprises an aqueous sulfate solution which contains at least about 20 grams per liter of a buffering agent selected from organic acids and their salts which do not precipitate nickel out of the electrolyte, are resistant to oxidizing conditions in the cell and have a dissociation pK of about 2–5 at 25° C, and wherein the electrowinning is carried out at a temperature of about 40°–60° C, the pH of the electrolyte within the cell being maintained at about 3 to 4 while the relative flow rates of electrolyte into and out of the cell are selected to maintain a substantially constant volume of electrolyte within the cell and to cause the nickel concentration in the electrolyte to be depleted by at least about 10 grams per liter on passage through the cell.

4,087,339

ELECTROWINNING OF SULFUR-CONTAINING NICKEL

Robert William Elliott, Mississauga; John Ambrose, Oakville, and Victor Alexander Ettel, Mississauga, all of Canada, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Jan. 11, 1977, Ser. No. 758,483
Claims priority, application Canada, Jul. 2, 1976, 256198
Int. Cl.[2] C25C *1/08, 7/04*
U.S. Cl. 204—112 6 Claims



1. A process for producing sulfur-containing nickel comprising establishing an aqueous electrolyte which contains in solution nickel ions, chloride ions and a sulfur-bearing compound selected from the group consisting of sulfur dioxide, thiourea, toluene sulfonamide as well as sulfites, bisulfites, thiosulfates and tetrathionates of alkali and alkaline earth metals, electrodepositing nickel from said electrolyte in a cell having at least one electrode assembly, which assembly comprises an anode substantially insoluble in said electrolyte, a cathode, an anolyte diaphragm-means for isolating said anode and a volume of said electrolyte adjacent thereto from the remainder of said electrolyte within said cell and a catholyte diaphragm-means for isolating said cathode and a volume of said electrolyte adjacent thereto from the remainder of said electrolyte within said cell, and maintaining a flow of said electrolyte through said cell during electrodeposition by introducing fresh electrolyte to the interior only of said catholyte diaphragm-means and withdrawing spent electrolyte from the exterior only of said catholyte diaphragm-means.

4,087,340

PRODUCTION OF METALLIC LEAD

John C. Stauter, Streamwood, and William K. Tolley, Arlington Heights, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Filed Feb. 16, 1977, Ser. No. 769,622
Int. Cl.[2] C25C *1/18*
U.S. Cl. 204—117 10 Claims

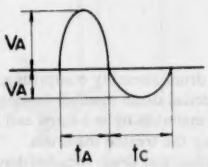
1. In a process for the production of metallic lead from a lead bearing source which comprises the steps of:
(a) halogenating said lead bearing source with a gaseous halogen;
(b) leaching the halogenated source with brine;
(c) filtering the resultant solution to separate elemental sulfur, residue and soluble lead halide;
(d) crystallizing said lead halide; and
(e) recovering metallic lead by electrolysis, the improvement which comprises subjecting said lead bearing source to an activation heat treatment prior to the halogenation step.

4,087,341

PROCESS FOR ELECTROGRAINING ALUMINUM SUBSTRATES FOR LITHOGRAPHIC PRINTING

Masahiro Takahashi, Shizuoka; Teruo Miyashita; Akira Morita, both of Fuji, and Ken Sato, Shimizu, all of Japan, assignors to Nippon Light Metal Research Laboratory Ltd., Tokyo, Japan

Filed Nov. 4, 1976, Ser. No. 738,945
Claims priority, application Japan, Nov. 6, 1975, 50-132496; Jun. 11, 1976, 51-67780
Int. Cl.[2] C25F *3/04*
U.S. Cl. 204—129.43 5 Claims



1. A process for electrolytically etching aluminum substrates to impart thereto a uniform "pits-within-a-pit" surface structure for lithographic printing, comprising the steps of subjecting the aluminum substrate to electrolytic etching in an electrolytic cell filled with an electrolyte consisting essentially of hydrochloric acid or nitric acid; by means of a regulated alternating current applying an inter-electrode voltage with the anodic voltage of greater magnitude than cathodic voltage and the ratio of the cathodic coulombic input to the anodic coulombic input being less than 1, said ratio being in the range of 0.3–0.8 for a hydrochloric acid containing electrolyte and in the range of 0.4–0.8 for a nitric acid containing electrolyte.

4,087,342

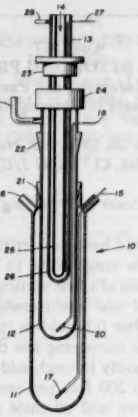
METHOD OF SIMULTANEOUSLY CARRYING OUT PLURALITY OF PHOTOCHEMICAL REACTIONS

Jordan J. Bloomfield, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 22, 1976, Ser. No. 753,663
Int. Cl.[2] B01J *1/10;* B01K *1/00*
U.S. Cl. 204—157.1 R 5 Claims

1. A method of carrying out photolysis comprising simultaneously irradiating a plurality of photochemical reactions in which said reactions are carried out in separate reaction cham-

bers adjacent to each other in a series and accessible to a single polychromatic light source whereby each said reaction utilizes



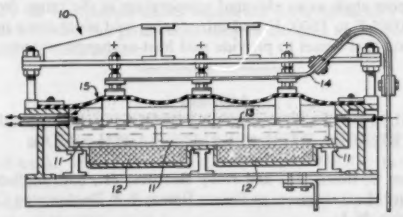
a different region of the light spectrum and provides a filter for the next adjacent reaction more remote from the light source.

4,087,343

FLEXIBLE COVER OF A PLATY-FILLED COMPOSITION FOR AN ELECTROLYTIC CELL

Harry Samuel Custer, Barberton, and Robert Charles Schisler, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 23, 1977, Ser. No. 771,225
Int. Cl.[2] C25D *17/00*; C25B *9/00*
U.S. Cl. 204—219 **22 Claims**



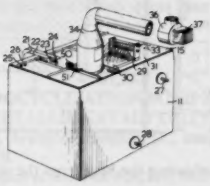
1. In an electrolytic cell for the production of halides, a flexible elastomeric cover for said cell, said cover having at least one layer comprised of a corrosion resistant elastomeric composition including a vulcanized rubbery polymer to resist deleterious fluids and a multiplicity of small, non-porous, inert particles of a plate-like structure dispersed throughout said polymer to further resist the permeation and penetration of such deleterious fluids into the cover with the preponderance of said particles having an aspect ratio of at least 20:1 and being oriented in a direction generally parallel to a surface of the cover to provide a barrier to the migration of such deleterious fluids.

4,087,344

ELECTROLYTIC CELL

Harold Vincent Casson, Napanee, Canada, and Richard Eric Loftfield, Chardon, Ohio, assignors to Huron Chemicals, Ltd., Canada

Filed Jun. 17, 1976, Ser. No. 697,158
Int. Cl.[2] C25B *15/08, 9/00*
U.S. Cl. 204—239 **5 Claims**



1. An electrolytic cell adapted to contain an electrolytic solution and having an electrode assembly of anode and cathodes adapted to electrolyze said electrolytic solution to generate a dissolved product and a gas, and including conduits for the outflow of electrolyte from the electrode assemblies and including also riser rods located laterally of the electrode assemblies electrically to connect bus bars to the electrode assemblies a removable casing placed over said electrode assembly between said riser rods to receive the electrolytic solution containing said dissolved product and said gas and to let electrolytic solution and gas separate inside said casing and to divide said cell into a separate cell chamber within said casing and a cooling and concentration chamber outside of said casing, said casing being arranged so that it can be raised free of the electrolytic cell without interference from said bus bars at least one conduit communicating between said cell chamber and said cooling, evaporation and concentration chamber for the circulation of electrolytic solution from the cell chamber to the cooling and concentration chamber, without the circulation of gas between said chambers at least one conduit communicating between said cooling and concentration chamber and said cell chamber for the circulation of electrolytic solution from the cooling and concentration chamber to the cell chamber, without the circulation of gas between said chambers and said chambers being sealed against the passage of gas from one to the other, means for removing said gas from the interior of said casing, inlet and outlet means for producing a gas sweep through cooling and concentration chamber across the surface of the electrolyte in such chamber to cool the electrolyte and evaporate part of said electrolyte so as to concentrate it, means for introducing fresh electrolytic solution into said electrolytic cell and means for removing solution containing the dissolved product.

4,087,345

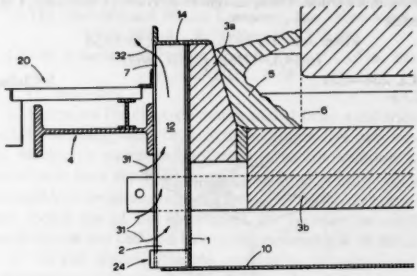
POTSHELL FOR ELECTROLYTIC ALUMINUM REDUCTION CELL

Eystein Edmund Sandvik, and Otto Johannes Strömme, both of Ardalstangen, Norway, assignors to Ardal og Sunndal Verk a.s., Oslo, Norway

Filed Jul. 19, 1977, Ser. No. 817,017
Int. Cl.[2] C25C *3/10, 7/00*
U.S. Cl. 204—243 R **9 Claims**

1. A potshell for an electrolytic cell for the electrolytic reduction of aluminum, said potshell comprising a bottom plate, side walls and end walls formed of steel plates; vertical stiffeners disposed against the exterior of the side walls; an essentially horizontal reinforcing frame disposed exterior of and surrounding said stiffeners; vertical, free air passages being

provided between said stiffeners up against the side walls and the end walls; and said stiffeners acting as cooling ribs for



conducting and dissipating the heat from the side walls and the end walls.

4,087,346
ELECTROPHORETIC APPARATUS

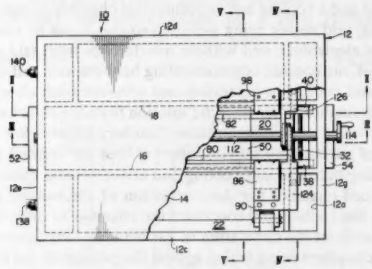
Tomohiro Kitahara, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Jun. 14, 1976, Ser. No. 695,417

Claims priority, application Japan, Jun. 14, 1975, 50-81260[U]; Oct. 14, 1975, 50-139129[U]; Oct. 14, 1975, 50-139130[U]

Int. Cl.² G01N *27/26, 27/28*

U.S. Cl. 204—299 R **9 Claims**



1. An electrophoretic apparatus for use in an analysis of a specimen such as blood serum applied to a belt-like carrier body comprising:

a main body having a chamber portion and entrance and exit windows formed in the opposite portions of the chamber portion,

a pair of buffer solution troughs disposed in the chamber portion and respectively containing a buffer solution,

a transport means for transporting the carrier body from the entrance window into the chamber portion and out of the chamber portion from the exit window,

a pair of high absorbent papers at least a part of each one of which is dipped into the buffer solution in respective buffer solution troughs,

a pair of contacting means movably disposed in the chamber portion for contacting each side end portion of the carrier body placed in the chamber portion with respective ones of said pair of high absorbent papers, including an operating rod rotatably mounted on said main body, at least a pair of cam disks mounted on said rod for rotation therewith, a pair of arms each engaging a cam surface of a cam disk for movement as said disk is rotated, and a pair of pressing plates each mounted on one of said arms for pressing said carrier body into contact with one of said papers,

wherein direct voltage is applied across both side end portions of the carrier body through the buffer solution in each buffer solution trough and respective high absorbent paper.

4,087,347
SHALE RETORTING PROCESS

Gordon E. Langlois, Lafayette, and Paul W. Tamm, Oakland, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Sep. 20, 1976, Ser. No. 724,800

Int. Cl.² C10G *1/02*

U.S. Cl. 208—11 R **2 Claims**

1. A continuous process for retorting oil shale which comprises:

(a) introducing a solid heat-transfer material at an elevated temperature in the range 1000° to 2000° F and oil shale into a lower portion of a first vertically elongated vessel at a weight ratio of said heat-transfer material to said oil shale of greater than 0.1 and less than 5;

(b) passing a lift gas containing less than 1 volume percent free oxygen upwardly through said first vessel at a linear velocity of 20 to 200 feet per second and sufficient to entrain and convey said oil shale and said heat-transfer material upwardly through said vessel, whereby said oil shale and said heat-transfer material are intermixed and said oil shale is rapidly heated to an elevated temperature between 700° F and 1200° F, vaporizing a first portion comprising less than 30 weight percent of the hydrocarbons in said oil shale, said oil shale having a residence time in said first vessel of less than 5 seconds;

(c) separating from said lift gas a solid fraction comprising said heat-transfer material and oil shale;

(d) introducing said solid fraction into the upper portion of a second vertically elongated vessel forming a downwardly moving bed of solids wherein additional heat is transferred from said heat-transfer material to said oil shale, vaporizing a second portion of the hydrocarbons in said oil shale;

(e) withdrawing retorted solids and said heat-transfer material from a lower portion of said second vessel;

(f) passing a stripping gas upwardly through said second vessel which entrains said vaporous second portion of hydrocarbons;

(g) separating condensable hydrocarbons from said lift gas and said stripping gas; and

(h) introducing retorted solids into a lift pipe combustor and combusting residual carbon in said retorted shale, forming spent shale at an elevated temperature in the range from 1000° F to 1600° F, and introducing said spent shale into said first vessel to provide said heat-exchange material.

4,087,348
DESULFURIZATION AND HYDROCONVERSION OF RESIDUA WITH ALKALINE EARTH METAL COMPOUNDS AND HYDROGEN

William C. Baird, Jr., and Roby Bearden, Jr., both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 571,904, Jun. 2, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,085

Int. Cl.² C10G *13/04;* B01J *27/04*

U.S. Cl. 208—108 **15 Claims**

1. A process for simultaneously desulfurizing and hydroconverting a heavy, sulfur-containing hydrocarbon feedstock which comprises contacting said feedstock and hydrogen in a reaction zone, said feedstock being substantially in the liquid phase in said reaction zone, with a reagent selected from the group consisting of alkaline earth metal hydrides, oxides and mixtures thereof at a temperature within the range of from about 700° to about 1500° F and a hydrogen partial pressure ranging from about 1500 to 3000 psig to form an oil product

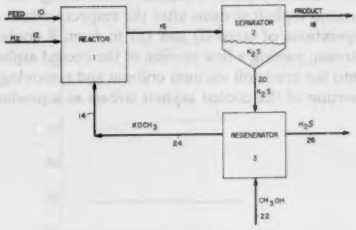
having a reduced sulfur and Conradson carbon content and an alkaline earth metal sulfide phase.

4,087,349

HYDROCONVERSION AND DESULFURIZATION PROCESS

William C. Baird, Jr., Baton Rouge, La., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Jun. 27, 1977, Ser. No. 810,303
Int. Cl.[2] C10G *13/06;* B01J *27/04*
U.S. Cl. 208—108 9 Claims



1. A process for simultaneously hydroconverting and desulfurizing a sulfur-containing heavy hydrocarbonaceous oil feed, which comprises reacting said oil with an alkali metal alkoxide derived from a C_1 to C_4 aliphatic monohydroxy saturated alcohol, in the presence of added hydrogen at hydroconversion and desulfurization conditions including an elevated temperature, and recovering a hydroconverted oil.

4,087,350

OLEFINS PRODUCTION BY STEAM CRACKING OVER MANGANESE CATALYST

Alexander John Kolombos, Sutton; Donald McNeice, Reigate, and Dennis Charles Wood, Sunbury, all of England, assignors to The British Petroleum Company Limited, London, England

Filed Sep. 2, 1976, Ser. No. 719,918
Claims priority, application United Kingdom, Sep. 25, 1975, 39283/75
Int. Cl.[2] C07C *11/04;* C10G *11/04;* B01J *8/24*
U.S. Cl. 208—121 8 Claims

1. A process of producing olefins by cracking at elevated temperature in the presence of steam a hydrocarbon feedstock consisting essentially of atmospheric residue and/or vacuum residue boiling above 500° C over a catalyst consisting essentially of manganese oxide supported on a refractory oxide selected from the group consisting of zirconia and titania in a fluidized bed reactor.

4,087,351

DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 581,249, May 27, 1975, Pat. No. 3,998,723, which is a continuation-in-part of Ser. No. 480,793, Jun. 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, Jul. 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, Mar. 17, 1969, Pat. No. 3,740,328. This application Dec. 13, 1976, Ser. No. 750,333
The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed.
Int. Cl.[2] C10G *35/08*
U.S. Cl. 208—139 20 Claims

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 2 wt. % rhenium, about 0.01 to about 5 wt. % tin and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium, rhenium and tin are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium, rhodium and rhenium are present in the elemental metallic state; and wherein substantially all of the tin is present in an oxidation state above that of the elemental metal and in a particle size which is less than 100 Angstroms in maximum dimension.

4,087,352

DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 626,151, Oct. 28, 1975, Pat. No. 4,003,826, which is a continuation-in-part of Ser. No. 422,464, Dec. 6, 1973, Pat. No. 3,915,845. This application Jan. 10, 1977, Ser. No. 758,237
The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.
Int. Cl.[2] C10G *35/08*
U.S. Cl. 208—139 32 Claims

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, calculated on a wt. % of finished composite and on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 5 wt. % Group IVA metal, about 0.1 to about 3.5 wt. % halogen, and a lanthanide series component in an amount sufficient to result in an atomic ratio of lanthanide series metal to platinum group metal of about 0.1:1 to about 1.25:1; wherein the platinum group metal, Group IVA metal and lanthanide series component are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; and wherein substantially all of the Group IVA metal and the lanthanide series component are present in an oxidation state above that of the corresponding elemental metal.

4,087,353

HYDROPROCESSING OF SULFUROUS KEROSENE TO IMPROVE JET FUEL CHARACTERISTICS THEREOF

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 696,165, Jun. 14, 1976, Pat. No. 4,014,783, which is a division of Ser. No. 585,265, Jun. 9, 1975, Pat. No. 3,996,304, which is a continuation-in-part of Ser. No. 480,793, Jun. 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, Jul. 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, Mar. 17, 1969, Pat. No. 3,740,328. This application Mar. 9, 1977, Ser. No. 776,071
Int. Cl.[2] C07C *5/10;* C10G *23/04;* B01J *29/16*
U.S. Cl. 208—143 7 Claims

1. A process for improving the jet fuel characteristics of a sulfurous kerosene boiling range fraction, which comprises reacting said kerosene fraction and hydrogen, at a maximum catalyst temperature below about 750° F., in a catalytic reaction zone containing a catalytic composite of an alumina-containing inorganic porous carrier selected from the group consisting of alumina, silica-alumina, chromia-alumina, alumina-boria, alumina-silica-boron phosphate and crystalline aluminosilicate, from about 0.1% to 1.5% by weight of a halogen component, on an elemental basis, a platinum or palladium component, a rhodium component and a tin component, and separating the resulting reaction zone effluent to recover a

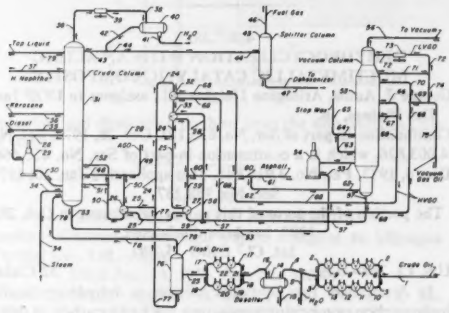
normally liquid kerosene fraction having improved jet fuel characteristics.

4,087,354

INTEGRATED HEAT EXCHANGE ON CRUDE OIL AND VACUUM COLUMNS

Norman F. Hessler, Wheeling, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 18, 1976, Ser. No. 743,027
Int. Cl.[2] C10G *7/00*
U.S. Cl. 208—251 R **2 Claims**



1. A process for fractionating a crude oil which comprises the steps of:

(a) desalting a crude oil feed stream to form a desalted crude oil stream;

(b) heating the desalted crude oil stream by indirect heat exchange against a liquid stream removed as a sidecut from a crude oil fractionation column;

(c) dividing the desalted crude oil stream into a flash zone vapor stream and a flash zone liquid stream by passing the desalted crude oil stream into a flash zone operated at effective flashing conditions;

(d) passing the flash zone vapor stream into the crude oil fractionation column;

(e) dividing the flash zone liquid stream into a first and a second aliquot portion having the same composition;

(f) heating the first aliquot portion of the flash zone liquid stream by indirect heat exchange against a heavy vacuum gas oil stream and then by indirect heat exchange against a first asphalt stream;

(g) heating the second aliquot portion of the flash zone liquid stream by indirect heat exchange against an atmospheric gas oil stream comprising hydrocarbonaceous liquid removed from the bottom one-half of the crude oil fractionation column and then by indirect heat exchange against a second asphalt stream;

(h) recombining the first and second aliquot portions of the flash zone liquid stream and passing the flash zone liquid stream into the crude oil fractionation column after heating, the crude oil fractionation column being operated at conditions effective to separate the desalted crude oil stream into a crude column bottoms stream, the atmospheric gas oil stream and at least two other liquid sidecut streams having lower end boiling points than the atmospheric gas oil stream, including a pressure above about 5 psig. and a bottoms liquid temperature of from 500° to about 720° F.;

(i) heating the crude column bottoms streams and passing the crude column bottoms stream into a crude oil vacuum column operated under conditions effective to separate the crude column bottoms stream into an asphalt bottoms stream, a heavy vacuum gas oil sidecut stream and a light vacuum gas oil sidecut stream, including a bottoms temperature of from about 650° to about 770° F. and a pressure of less than one atmosphere absolute;

(j) dividing the heavy vacuum gas oil sidecut stream into a first aliquot portion which is returned uncooled to the crude oil vacuum column and a second aliquot portion which is utilized as the heavy vacuum gas oil stream of step (f), and then dividing the heavy vacuum gas oil stream into a first and a second aliquot portion after heat exchange against the first portion of the flash zone liquid stream, with the first portion of the heavy vacuum gas oil stream also being returned to the crude oil vacuum column and the second portion being removed as a product; and,

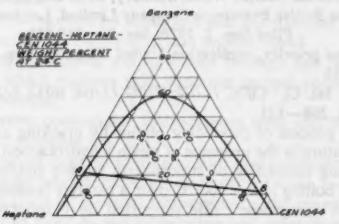
(k) dividing the asphalt bottoms stream into a first and a second aliquot portion and thereby forming the first and the second asphalt streams, recombining the first and second asphalt streams after the respective heat exchange operations of steps (f) and (g) to form a cooled asphalt stream, passing a first portion of the cooled asphalt stream into the crude oil vacuum column and removing a second portion of the cooled asphalt stream as a product.

4,087,355

SOLVENT EXTRACTION OF AROMATIC HYDROCARBONS

Clyde Edward Baxter, Angleton, and Arthur Emilio Gurgiolo, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 13, 1976, Ser. No. 722,934
Int. Cl.[2] C10G *21/20*
U.S. Cl. 208—330 **7 Claims**



1. A process for the separation of aromatic hydrocarbon compounds from mixtures containing both aromatic and non-aromatic compounds which comprises:

(A) contacting a mixture containing both aromatic and non-aromatic hydrocarbon compounds with an cyanoethylated alkoxylated polyol solvent having at least three alkoxylated hydroxyl groups to form an extract containing said solvent and the aromatics wherein said solvent has the formula

$$TZ—CH_2+C(R_1)(R_2)]_a[CH_2]_b\,CH_2—ZT$$

wherein T is cyanoethyl or hydrogen, Z is the divalent group represented by $(CH_2)_y O—C_nH_{2n}—O)_x$ n is a whole number from 2–4, x is a number having an average value from 3–40 and x has an average value equal to or less than 3 when n is 3 or 4, y is 0 or 1, a is 1–4, b is 0–3, R_1 is hydrogen, $—CH_3$, $—C_2H_5$ or —ZT, R_2 is hydrogen or —ZT, with the proviso that at least one of R_1 or R_2 is —ZT and at least one T group is cyanoethyl, and

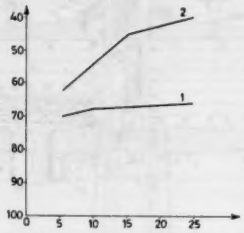
(B) separating said extract from the non-aromatic hydrocarbon compounds.

4,087,356

METHOD FOR DEPOLLUTING FRESH AND SEA WATER FROM PETROLEUM PRODUCTS

Walter Marconi, Via Caviaga 1, S. Donato Milanese, Milan; Roberto Olivieri, Via A. Moscatelli, 109 - Mentana, Rome; Ludwig Degen, Via Ubaldo Peruzzi, 62 - Rome, and Andrea Robertiello, Via delle Egadi, 36 - Rome, all of Italy, assignors to Snamprogretti S.p.A., Milan, Italy

Filed Nov. 4, 1976, Ser. No. 738,697
Claims priority, application Italy, Dec. 3, 1975, 29959/75
Int. Cl.[2] C02B *9/02*
U.S. Cl. 210—11 3 Claims



2. The method of removing hydrocarbonaceous pollutants from the surface of water which is polluted thereby and which contains aqueous microorganisms capable of metabolizing said hydrocarbonaceous pollutants, which comprises dispersing over said polluted surface particles comprised of:

(a) paraffinized magnesium ammonium phosphate;
(b) a ureidic derivative selected from 1-ureido-1-hydroxy-3-methyl-butane, crotonylidene-diurea, and 1-ureido-1-hydroxy-3-phenylpropane;
(c) 2,2'-hydroxydiethylolamide; and
(d) freeze-dried hydrocarbon-oxidizing microorganisms.

4,087,357

DESALINATION PROCESS USING THERMALLY REGENERABLE RESINS

James H. Barrett, Cornwells Heights, and David H. Clemens, Willow Grove, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 429,012, Dec. 27, 1973, abandoned. This application Oct. 9, 1974, Ser. No. 513,375
Int. Cl.[2] B01D *15/04, 15/06*
U.S. Cl. 210—32 17 Claims

1. A method for desalinating liquids containing metal salts which comprises:

(a) contacting such liquids with a mass or bed of thermally regenerable hybrid ion exchange resin to adsorb metal salts, said hybrid ion exchange resin being an intraparticulate heterogeneous product having two relatively independent and separate polymer phases wherein the pores of a preformed crosslinked macroreticular host polymer phase are at least partially filled with a second crosslinked guest polymer phase, with the separate phases having differing ion exchange functionality, and
(b) regenerating the hybrid resin by elution with an aqueous liquid at a temperature greater than that of the liquid at time of contact with the resin.

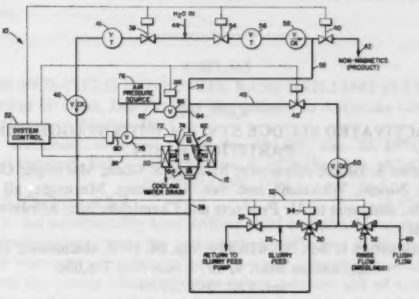
4,087,358

AUGMENTING AND FACILITATING FLUSHING IN MAGNETIC SEPARATION

Robin R. Oder, Novato, Calif., assignor to J. M. Huber Corporation, Locust, N.J.

Filed Oct. 12, 1976, Ser. No. 731,398
Int. Cl.[2] B01D *23/24*
U.S. Cl. 210—42 S 3 Claims

1. In the method for effecting magnetic separation of magnetically attractable particles from a dispersion of said particles in a fluid carrier, by flowing said dispersion through a nonmagnetic canister including a porous ferromagnetic matrix while applying a magnetic field to said matrix; and wherein said method includes at least one step wherein impurities collected by said matrix are flushed from the matrix to regenerate same; the improvement comprising:



applying auxiliary mechanical forces to dislodge said collected magnetics, thereby augmenting the results achieved in accordance with said flushing step, wherein said auxiliary mechanical forces include augmented drag forces provided by utilizing a viscious flushing medium consisting of a clay slurry to thereby increase the viscous forces acting on collected particles within said matrix.

4,087,359

PROCESS FOR REMOVING MERCURY AND MERCURY SALTS FROM LIQUID EFFLUENTS

Germano Patron, Venice; Domenico Napoli, Venice-Mestre; Franco Nardone, Mestre (Venice); Gianluigi Ratti, Venice, and Giuseppe Tubiello, Novara, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 495,782, Aug. 8, 1974, abandoned. This application Feb. 18, 1976, Ser. No. 658,976
Claims priority, application Italy, Aug. 9, 1973, 27716 A/73
Int. Cl.[2] C02B *1/20*
U.S. Cl. 210—50 7 Claims

1. A process for removing mercury and mercury salts from aqueous industrial plant effluents containing the same, together with suspended muds and other solids consisting essentially of Ca and Fe hydroxides, basic Mg carbonate, SiO_2 and any silicates present in the aqueous industrial plant effluent, said process comprising reacting the effluent at a pH of from 9 to 13, with thiourea, in a minimum amount of 0.38 grams of thiourea per gram of soluble mercury fed, until the mercury and mercury salts are precipitated, and thereafter separating the precipitate thus formed from the resulting slurry, together with any muds and other solids present in the starting aqueous industrial plant effluent, by clari-flocculation.

4,087,360

METHOD OF INHIBITING SCALE FORMATION

John P. Faust; Henry R. Cramer, and John M. Casberg, all of Cheshire, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Sep. 24, 1975, Ser. No. 616,118
Int. Cl.[2] C02B *5/06*
U.S. Cl. 210—58 9 Claims

1. An agglomerate composition consisting essentially of calcium hypochlorite and a solubility reducing proportion of a polyacrylic acid compound having a molecular weight of from about 700 to about 3000 selected from the group consisting of polyacrylic acid, alkali metal salts of polyacrylic acid and mixtures thereof, wherein said solubility reducing proportion

of said polyacrylic acid compound is from about 0.0001 to about 10 percent by weight of said calcium hypochlorite.

4,087,361

ACTIVATED SLUDGE SYSTEM WITH STAGGERED PARTITION BASIN

Charles S. Block, Allentown; Michael S. Chen, Macungie; Olaf J. Noichl, Whitehall, and Sun-Nan Hong, Macungie, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation of Ser. No. 616,459, Sep. 24, 1975, abandoned. This application Mar. 9, 1977, Ser. No. 776,056
Int. Cl.[2] C02C *1/10*
U.S. Cl. 210—199 7 Claims

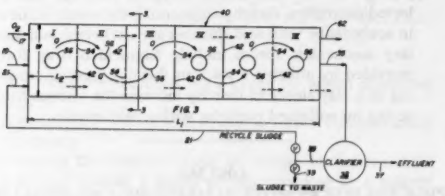


FIG. 3

1. An aeration basin for aerating mixed liquor in an activated sludge system comprising:

(a) wall means forming an elongated, rectangular basin having side walls, an inlet and an outlet end; the length to width ratio of said basin being within the range of 1.8 to 4.0;

(b) means for supplying wastewater and recycled sludge to the inlet end of said basin to form mixed liquor therein;

(c) a plurality of rotary aerator means located at spaced locations along the length of said basin between said inlet and outlet ends for aerating said mixed liquor flowing throughout the elongated length of said basin from said inlet end to said outlet end;

(d) a plurality of staggered partition means extending laterally from alternate side walls for a distance in the order of one half the width of said basin, said staggered partition means extending throughout the depth of the mixed liquor and transverse to said lengthwise flow of mixed liquor and being positioned between said aerator means to form a plurality of liquid passes through which said mixed liquor flows in sequence, said liquid passes having length to width ratios within the range of 0.60 to 1.00 and forming a generally serpentine flow path through the basin, said staggered partition means being of a lateral extent and shape such as to provide open and nonrestricted liquid flow paths for backmixing between adjacent liquid passes, said non-restricted flow paths having cross-sectional areas within the range of 40% to 60% of the wetted cross-sectional area of said basin; and

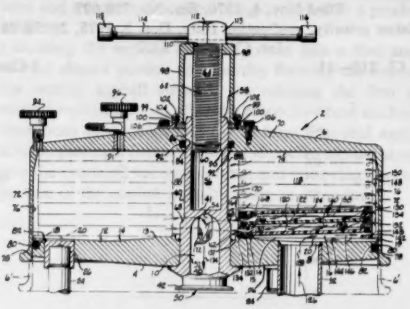
(e) said basin having a wetted cross-sectional area of such predetermined size, and said rotary aerator means having predetermined values of diameter (D) and RPM (N), such that the aerator mixing factor ($N \times D/U$) is maintained within the range of 20 to 450, whereby said aeration basin achieves a substantially greater number of effective liquid stages.

4,087,362

FILTER HOUSING

Francis Baird Hutto, Jr., Sedalia, Colo., assignor to Johns-Manville Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 642,647, Dec. 19, 1975, abandoned. This application Mar. 4, 1976, Ser. No. 663,952
Int. Cl.[2] B01D *31/00*
U.S. Cl. 210—249 8 Claims



1. A housing for at least one membrane filter and its associated support plates which comprises:

(a) a base having therein a non-centrally located access port and a centrally located access port;

(b) a cover having a top with a central aperture, an underside and at least one side extending downwardly from said top, said cover being dimensioned relative to said base such that the inner surface of said side abuts the face of the peripheral edge of said base;

(c) an upwardly extending hollow core member seated in said centrally located access port in said base, and extending upward through said central aperture in said cover, the core member being divided by an internal transverse barrier into an upper and a lower hollow chamber, each opening respectively at an axial end of the core member having no communication with the other, and the upper chamber also having no communication with the interior of the housing, with at least a portion of the inner side of the upper chamber of said core member being threaded to receive a correspondingly threaded screw, with said core member also containing aperture means extending below the level of the upper surface of the base and permitting fluid communication between the interior of said housing and the interior of said lower chamber of said core member, which lower chamber also communicates with said centrally located access port;

(d) central sealing means encircling said core member;

(e) peripheral sealing means to prevent liquid inside said housing from passing out of said housing between said base and said base and said cover;

(f) cover sealing means to prevent fluid flow outwardly of said housing through said central aperture in said cover; and

(g) a reversible screw assembly attached to said cover and cooperating with the threaded portion of said upper chamber of said core member, such that as said screw assembly traverses vertically in cooperation with said core member, said cover simultaneously moves vertically and cooperates with said peripheral sealing means to maintain a fluid-tight housing of variable height to accommodate differing numbers of filters and associated support plates in the interior of said housing; whereby when a set of support plates and associated filters are enclosed in the housing the elements (a) through (g) cooperate with each other and the plates to define a fluid flow path between the two access ports directed first radially outwardly from one access port to the periphery of the base and then radially inwardly to the other access port, with that por-

tion of the flow path between said centrally located access port and said periphery of said base also passing through said filters.

4,087,363

FILTER FOR BLOOD

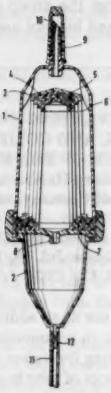
Friedrich Rosemeyer, Urberach; Wolfram Hubert Walker, Oberroden; Karl-Heinz Ganshirt, Sprendlingen und, and Heinz Wendt, Senden, all of Germany, assignors to Biotest-Serum-Institut GmbH, Frankfurt, M.-Niederrad, Germany

Filed Mar. 22, 1976, Ser. No. 669,052

Claims priority, application Germany, Mar. 22, 1975, 7509246[U]; Feb. 26, 1976, 76057006[U]

Int. Cl.² B01D *25/04, 39/16*

U.S. Cl. 210—315 3 Claims



1. A filter for blood comprising a pair of members together forming a housing with an inlet and an outlet, an apertured diaphragm between said members across the interior of said housing and dividing said housing into a filter chamber and a drip chamber respectively communicating with said inlet and outlet, means forming a hermetic and sterile seal between said members, and four filter elements each in the form of a woven screen and having respective screen sizes of about 200μ, 50μ, 20μ and 10μ with the openings in each screen being uniform in size, the screens being serially disposed within said housing in order of descending screen size in the downstream so that blood being filtered therethrough must pass in sequence through said inlet, through all of said filter elements of progressively smaller screen size, through the aperture of said diaphragm and then through said outlet whereby said filter is capable of passage of blood therethrough at a high filtration rate.

4,087,364

LIQUID SLURRY OF SUBMICRON PARTICLES OF HEXABROMOBENZENE, AND PROCESS OF MANUFACTURE

Daniel Stanley Katz, Norwalk, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 327,058, Jan. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 265,120, Jun. 22, 1972, abandoned. This application Oct. 15, 1976, Ser. No. 732,619

Int. Cl.² C07C *25/00*

U.S. Cl. 252—8.1 8 Claims

1. An aqueous slurry of particulate hexabromobenzene, the particles of which have an average diameter between about 100A and 3000A and are present in an amount from about 0.1 to 40%, by weight, based on the total weight of said slurry.

7. A process for preparing particulate hexabromobenzene of an average particle diameter of about 100A to 3000A, which process comprises: vaporizing hexabromobenzene in a first zone at a temperature of from about 180° C.–350° C.; transporting the vaporized hexabromobenzene to a second zone by means of a carrier gas consisting of air or steam at a temperature of from about 180° C.–350° C.; condensing the vaporized hexabromobenzene in said second zone by an aqueous sodium thiocyanate solution quench medium to form stabilized particles of a diameter in the range of about 100A to 3000A; and thereafter recovering the stabilized hexabromobenzene particles.

4,087,365

SUPER-YIELD BENTONITE BASE DRILLING FLUID

Arthur G. Clem, Des Plaines, Ill., assignor to American Colloid Company, Skokie, Ill.

Continuation-in-part of Ser. No. 436,931, Jan. 28, 1974, abandoned. This application Jun. 8, 1976, Ser. No. 693,839

Int. Cl.² C09K *7/02*

U.S. Cl. 252—8.5 A 6 Claims

1. An aqueous clay base drilling fluid composition comprising water, bentonite clay and a polymer effective in increasing the viscosity of a bentonite clay-water suspension selected from the group consisting of a partial calcium salt of sodium polyacrylate, a partial calcium salt of polyacrylic acid and mixtures thereof, said polymer having about 1 to 15% calcium acrylate moieties wherein the polymer is present in an amount greater than about 7% by weight, based on the total weight of bentonite, wherein each polymer, when added to water in an amount of 1% by weight has a viscosity greater than about 10 centipoises.

4,087,366

METHOD OF PREPARING A PIEZOELECTRIC CERAMIC COMPOSITION

Yoichi Tanaka, Funabashi; Masamichi Tsuruta; Koji Takahashi, both of Chiba; Tsutomu Hasegawa, Tokyo, and Makoto Hori, Ichihara, all of Japan, assignors to TDK Electronic Company, Tokyo, Japan

Filed Nov. 30, 1973, Ser. No. 420,653

Int. Cl.² C04B *35/46, 35/48, 35/64*

U.S. Cl. 252—62.9 2 Claims

1. A method for preparing a piezoelectric ceramic composition of the formula

$$x\ (\text{Pyrochlore composite oxide})_3 \cdot (1-x)\ [y(PbTiO_3)z(PbZrO_3)]$$

wherein said pyrochlore composite oxide is selected from the group consisting of $Cd_2Sb_2O_7$, $Cd_2Nb_2O_7$, $Pb_2Sb_2O_7$, $Pb_2Nb_2O_7$, $Sr_2Sb_2O_7$, $Sr_2Nb_2O_7$, $Ba_2Sb_2O_7$ and $Ba_2Nb_2O_7$; $0.2 \leqq y \leqq 0.8$; $0.2 \leqq z \leqq 0.8$; $y+z = 1.0$ and $0.001 \leqq x \leqq 0.2$, and containing 0.01 to 3.0 wt% Mn as MnO_2 comprising:

individually forming lead titanate, lead zirconate and pyrochlore composite oxide components;

mixing said components with MnO_2 in an amount equivalent to 0.01 to 3.0 wt% Mn to provide a mixture in which said lead titanate, lead zirconate and pyrochlore composite oxide are present in amounts that satisfy said formula; and

sintering said mixture at a temperature greater than 1000° C to form said piezoelectric composition.

4,087,367

PREFERENTIAL ETCHANT FOR ALUMINIUM OXIDE

Jean-Pierre Rioult, Thaon, and Raymond Fabien, Douvres-la-Delivrande, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,939

Claims priority, application France, Oct. 18, 1974, 74 35151

Int. Cl.² C09K *13/00, 13/06;* H01L *21/465*

U.S. Cl. 252—79.1 12 Claims

1. An etchant for preferentially removing aluminium oxide from bodies, consisting essentially of a non-aqueous solution of

ammonium fluoride in organic solvent, the solution being essentially free of hydrofluoric acid and unbound water.

4,087,368

WATER-SOLUBLE ENZYME GRANULES

Giuseppe Borrello, Anzio, Italy, assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 441,283, Feb. 11, 1974, abandoned, and Ser. No. 204,696, Dec. 3, 1971, abandoned. This application Jul. 1, 1975, Ser. No. 592,285

The portion of the term of this patent subsequent to Nov. 27, 1990, has been disclaimed.

Int. Cl.[2] C07G *7/02;* C11D *3/20;* B11D *3/39;* C11D *1/02*

U.S. Cl. 252—89 R 6 Claims

1. Water-soluble enzyme granules characterized by good flow properties, resistance to caking, segregation and dusting, and which have improved enzyme stability consisting essentially of 5–95% by weight of a magnesium alkyl sulfate having an average chain length of between 10 to 16 carbon atoms or an ethoxylate thereof containing from about 5 to 50 moles of ethylene oxide, 5 to 20% by weight of water, and a proteolytic enzyme in an amount sufficient to provide about 0.1 to 4 Anson units per gram of granules, said granules being produced by extrusion and being in the form of cylindrical rods having a diameter of about 0.4 mm. to 0.8 mm. and a length of about 2 mm. to 10 mm. or in the form of spheres having a diameter of about 0.5 mm. to 1 mm., which form is suitable for addition to particulate washing products having a diameter of about 0.2 mm. to 2 mm.

4,087,369

PEROXYBLEACH ACTIVATED DETERGENT COMPOSITION

Jean Wevers, Bruxelles, Belgium, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Nov. 8, 1976, Ser. No. 739,404

Int. Cl.[2] C11D *7/54*

U.S. Cl. 252—102 13 Claims

1. A granular peroxybleach-activated detergent composition having improved storage stability, particularly under alkaline conditions, consisting essentially of:

a. from about 3% to about 45% by weight of the composition of an organic surface-active agent selected from the group of anionic, nonionic, ampholytic, and zwitterionic surface-active agents, and mixtures thereof;

b. from about 5% to about 70% by weight of the composition of a detergent builder component;

c. from about 4% to about 80% by weight of the composition of a peroxybleach component; and

d. from about 0.5% to about 20% by weight of the composition of a particulate crystalline peroxybleach activator having a mean particle diameter in the range from about 1.8 mm to about 0.5 mm, and a rate of hydrolysis in the range from about 45% to about 5% by weight, determined by dissolving 7.46×10^{-3} moles of said activator in 500 mls. of a continuously stirred 0.4% w/v detergent solution at 20° C and ph 4 for seven minutes, said detergent solution being free of any peroxybleach component, then adjusting said ph to 9.7, and 60 minutes after said pH adjustment, determining the amount of activator which has hydrolyzed.

4,087,370

PHOTORESIST STRIPPER SYSTEMS

Joseph Don Singalewitch, Florham Park, and Winifred Reinhardt, Pompton Lakes, both of N.J., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Division of Ser. No. 520,590, Nov. 4, 1974, abandoned. This application Apr. 13, 1976, Ser. No. 676,595

Int. Cl.[2] B08B *3/08;* C23G *5/02;* C11D *7/26*

U.S. Cl. 252—143 1 Claim

1. A method of removing exposed photopolymer film resist from a substrate, comprising:

contacting said substrate with a solution consisting essentially of at least 5% by weight monochloroacetic acid; 5 to 47% by weight acid selected from the group consisting of formic, acetic and propionic acids and their halogenated derivatives, 5 to 65% by weight water, and the remainder alcohol selected from the group consisting of methanol, ethanol, propanol and butanol and their halogenated derivatives.

4,087,371

METHOD OF PREVENTING INCRUSTATION ON HEATED SURFACES, AND COMPOSITION FOR THE PRACTICE OF THE METHOD

Norbert Lowicki, Duisburg-Hamborn, and Michael Sidillo, Ottweiler, Saar, both of Germany, assignors to Grillo-Werke Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 315,983, Dec. 18, 1972, abandoned. This application Jul. 29, 1974, Ser. No. 492,755

Int. Cl.[2] C02B *5/06*

U.S. Cl. 252—180 4 Claims

1. A composition for use as an additive to water containing dissolved inorganic salts, in an amount of additive of 10 to 60 mg per liter, for preventing formation of deposits on hot metal surfaces, including surfaces of tube heat exchangers, said composition consisting essentially of:

(A) sulfurous acid esters of hydrolyzed cane sugar and corn starch having a mole ratio of $C_6H_{12}O_6 : SO_2$ of at least 1 : 2,

(B) carboxymethylcellulose having a molecular weight of between 20 and 30,000, and

(C) sulfonated fatty alcohols of the type C_{10} to C_{18} and/or sulfonated beeswax having fatty acids with about 40% of combined SO_2, with the amount of (B) being 0.5 to 10% by weight relative to the amount of (A) and the weight ratio of (A) plus (B) to (C) being between 80 : 20 and 95 : 5.

4,087,372

AN ABSORBING SOLUTION FOR THE REMOVAL OF NITROGEN OXIDE FORM A GAS CONTAINING SAME

Shigeru Saitoh; Tetsuya Watanabe; Koji Konno, and Tadashi Nakamura, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 517,370, Oct. 23, 1974, abandoned. This application Jan. 22, 1976, Ser. No. 651,422

Claims priority, application Japan, Oct. 31, 1973, 48-122598; Dec. 22, 1973, 48-179; Apr. 30, 1974, 49-48549

Int. Cl.[2] B01D *53/54*

U.S. Cl. 252—184 4 Claims

1. An absorbing solution for the removal of nitrogen oxide from a gas containing same by contact with said gas, said absorbing solution having a pH of 4 to 7 and comprising (a) an alkali metal salt, an ammonium salt or an alkaline earth metal salt of an organic acid selected from the group consisting of acetic acid, propionic acid, butyric acid, malonic acid, succinic acid, ethylenediaminetetraacetic acid and nitrilo triacetic acid, (b) an alkali metal sulfite or bisulfite, an ammonia sulfite or bisulfite, or an alkaline earth metal sulfite or bisulfite, and (c) a salt of metal selected from the group consisting of iron, cobalt, nickel, copper and manganese.

4,087,373

NOVEL METHOD FOR THE PRODUCTION OF HYDROGEN AND HYDROGEN-CARBON MONOXIDE MIXTURES

Russell Reed, Jr., Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 23, 1976, Ser. No. 708,236
Int. Cl.[2] C10K *3/00*
U.S. Cl. 252—188.3 R 1 Claim

1. A method for producing a hydrogen enriched hydrogen-carbon monoxide mixture which is suitable for use in the Fisher-Tropsch reaction comprising the steps of:

A. heating an alkaline earth formate to 300° to 400° C to produce solid alkaline earth carbonate and an equimolar mixture of gaseous carbon monoxide and hydrogen;

B. separating the equimolar mixture of gaseous carbon monoxide and hydrogen from the solid alkaline earth carbonate;

C. heating the alkaline earth carbonate to form solid alkaline earth oxide and gaseous carbon dioxide;

D. separating the solid alkaline earth oxide from the gaseous carbon dioxide;

E. reacting the alkaline earth oxide with water to form alkaline earth hydroxide;

F. reacting the alkaline earth hydroxide with the carbon monoxide from the equimolar mixture of carbon monoxide and hydrogen obtained in step A and separated in step B to form solid alkaline earth formate whereby the hydrogen from steps A and B is left in a free gaseous state;

G. separating the hydrogen from the alkaline earth formate in step F;

H. heating the alkaline earth formate formed in step F to produce solid alkaline earth carbonate and a second equimolar mixture of carbon monoxide and hydrogen; and

I. adding the equimolar mixture of carbon monoxide and hydrogen formed in step H to the hydrogen separated in step G.

4,087,374

PHOTODICHROIC CRYSTALS AND PREPARATION THEREOF

Irwin Schneider; William C. Collins, both of Alexandria, Va.; Oscar Imber, Wheaton, and Philipp H. Klein, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 30, 1975, Ser. No. 573,277
Int. Cl.[2] F21V *9/00*
U.S. Cl. 252—300 14 Claims

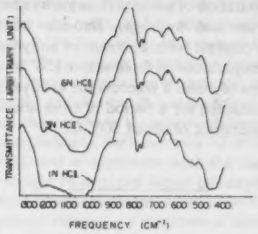
1. In a method of additively coloring an alkali fluoride crystal selected from the class consisting of lithium fluoride, sodium fluoride, potassium fluoride, and rubidium fluoride, the improvement which comprises selecting an alkali metal fluoride crystal consisting essentially of between 0 and 5 ppmA of OH^-, between 0 and 50 ppmA of one or more alkaline earth cations, between 0 and 50 ppmA non-fluorine halide anions, between 0 and 10 ppmA of $SiF_6^=$, between 0 and 30 ppmA of other ions, and said alkali metal fluoride.

4,087,375

METHOD FOR TREATING RADIOACTIVE WASTE WATER

Minoru Tanno, Shiogama, Japan, assignor to Shin Tohoku Chemical Industry Co., Ltd., Japan

Filed May 3, 1976, Ser. No. 682,405
Claims priority, application Japan, May 7, 1975, 50-55180; Aug. 8, 1975, 50-96433
Int. Cl.[2] C09K *3/00, 11/04*
U.S. Cl. 252—301.1 W 6 Claims



1. A process for treating radioactive waste water comprising passing said radioactive waste water through a mordenite column at a velocity of 2–50 cm/min. to adsorb and capture a variety of radionuclides contained therein on said mordenite.

4,087,376

CAPSULE MANUFACTURE

Peter L. Foris; Robert W. Brown, and Paul S. Phillips, Jr., all of Appleton, Wis., assignors to NCR Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 487,322, Jul. 10, 1974, Pat. No. 4,001,140. This application Dec. 30, 1976, Ser. No. 755,832
The portion of the term of this patent subsequent to Jan. 4, 1994, has been disclaimed.
Int. Cl.[2] B01J *13/02*
U.S. Cl. 252—316 10 Claims

1. A process for manufacturing minute capsules, en masse in an aqueous manufacturing vehicle, comprising the steps of:

(a) establishing an agitating aqueous system including monomeric dimethylol urea or methylated dimethylol urea, or a low molecular weight polymer thereof, about 0.75 to about 15 percent by weight, based on the weight of aqueous manufacturing vehicle, of a system modifier material selected from the group consisting of poly(ethylene-co-maleic anhydride), poly(methyl vinyl ether-co-maleic anhydride), poly(acrylic acid), poly(propylene-co-maleic anhydride), poly(isobutylene-co-maleic anhydride), poly(-butadiene-co-maleic anhydride), and poly(vinyl acetate-co-maleic anhydride) and particles of an intended capsule core material substantially insoluble in the system, in which agitating system the modifier material is present prior to the addition of said particles, and

(b) polycondensing said dimethylol urea or methylated dimethylol urea to form a condensation polymer resulting in

(i) liquid-liquid phase separation of the resulting condensation polymer above a molecular weight to be soluble in the system and

(ii) continued polycondensation of the separated polymerization product to give solid capsule wall material individually surrounding particles of the dispersed intended capsule core.

4,087,377

REGENERATION OF ACTIVATED CHARCOAL CATALYST USED IN SULFURYL FLUORIDE PRODUCTION

George S. Fujioka, Walnut Creek; Jim Love, and Russel R. Peterson, both of Concord, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 20, 1976, Ser. No. 752,701
Int. Cl.[2] B01J *21/20*; C01B *17/45*
U.S. Cl. 252—415 9 Claims

1. A method for regenerating the activated charcoal catalyst used in the preparation of sulfuryl fluoride by reaction of sulfur dioxide, chlorine and hydrogen fluoride which comprises contacting the catalyst with a stream of anhydrous hydrogen fluoride at a temperature of from about 350° to about 800° C.

8. The process of claim 1 wherein the catalyst and hydrogen fluoride are contacted for a period of from about 2 to about 4 hours at a temperature of about 500° C.

4,087,378

PREPARATION OF A SUPPORTED METAL PHTHALOCYANINE

David H. J. Carlson, Park Ridge, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 18, 1977, Ser. No. 760,295
Int. Cl.[2] B01J *31/02, 31/12*
U.S. Cl. 252—428 9 Claims

1. A method of preparing a supported metal phthalocyanine catalyst which comprises impregnating a solid adsorptive support with a common alcoholic solution of a metal phthalocyanine and a carboxylic acid containing up to about 10 carbon atoms in a weight ratio of acid to phthalocyanine of from about 1.5:1 to about 15:1, and thereafter drying the resulting catalytic composite.

4,087,379

CATALYST AND PROCESS FOR OLIGOMERIZING OLEFINS

Emmanuel R.E.G. Draguez Tripels de Hault, Waterloo; Marcel Van Tongelen, Diegem, and Henri R. Debus, Meise, all of Belgium, assignors to Labofina S. A., Brussels, Belgium

Filed Feb. 26, 1974, Ser. No. 445,876
Claims priority, application Belgium, Mar. 8, 1973, 12850
Int. Cl.[2] B01J *31/24, 31/22*
U.S. Cl. 252—429 B 13 Claims

1. A catalytic system for dimerizing and codimerizing olefins, consisting essentially of:

a. an aluminum compound of the formula $Al(R)_nX_{3-n}$ or a mixture of such compounds, wherein R is a straight chain or branched alkyl radical containing from 2 to 18 carbon atoms, n is 1,2, or 3, and X is a halogen;

b. an organic complex of a metal of Group VIII of the periodic table with an organic moiety selected from the group consisting of acetylacetonate, benzoylacetonate, and complexes of the formula $(P(R'')_3)_2X_2$ wherein X is halogen, and R'' is an alkyl, cycloalkyl, or aryl radical; and

c. a relative amount of sufficient to promote catalytic formation of dimers and codimers of a promotor comprising a compound of formula R'X wherein R' is a straight chain or branched chain alkyl radical containing from 3 to 12 carbon atoms, which may be optionally substituted with an aryl or cycloalkyl group, and X is a halogen.

4,087,380

POLYMERIZATION CATALYST

David Leslie Hyde, East Pleen, and Kenneth Clark Kirkwood, Larbert, both of Scotland, assignors to BP Chemicals Limited, London, England

Filed Jul. 19, 1976, Ser. No. 706,759
Claims priority, application United Kingdom, Jul. 30, 1975, 31891/75
Int. Cl.[2] B01J *31/02, 31/12*
U.S. Cl. 252—429 B 7 Claims

1. A process for the production of a supported Ziegler catalyst component comprising reacting a transition metal compound which is a chloride, chloro-alkoxide or oxychloride of titanium, vanadium, or zirconium, with an aliphatic alcohol containing 1–6 carbon atoms and impregnating a magnesium oxide support material with the product of said reaction, said reaction and impregnation being carried out under substantially anhydrous conditions.

4,087,381

ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

George J. Antos, Arlington Heights, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 633,890, Nov. 20, 1975, Pat. No. 4,024,052.
This application Jan. 12, 1977, Ser. No. 758,616
Int. Cl.[2] B01J *21/04, 23/10, 23/40, 23/74*
U.S. Cl. 252—441 17 Claims

1. An acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.05 to about 5 wt. % cobalt, about 0.01 to about 5 wt. % lanthanide series component, and about 0.1 to about 3.5 wt. % halogen; wherein the platinum group metal, catalytically available cobalt, and lanthanide series component are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic states; wherein substantially all of the lanthanide series component is present in an oxidation state above that of the elemental metal; and wherein substantially all of the catalytically available cobalt is present in the elemental metallic state or in a state which is reducible to the elemental metallic state under hydrocarbon conversion conditions or in a mixture of these states.

4,087,382

CATALYST

Sargis Khoobiar, Kinnelon, N.J., assignor to Halcon International, Inc., New York, N.Y.

Filed Nov. 24, 1976, Ser. No. 744,657
Int. Cl.[2] B01J *29/06, 29/16, 23/14*
U.S. Cl. 252—455 R 2 Claims

1. A catalyst composition suitable for the vapor-phase oxidation of an olefin to produce the corresponding unsaturated aldehyde with high selectivity comprising oxides of molybdenum, cobalt, iron, bismuth, thallium and antimony, and optionally silicon.

4,087,383

METHOD FOR ACID TREATING SOLID SUPPORTS

Martin O. Gernand, Baton Rouge, La.; Dale D. Maness, Austin, Tex., and Neville L. Cull, Baker, La., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Feb. 18, 1976, Ser. No. 658,919
Int. Cl.[2] B01J *21/04, 23/72*
U.S. Cl. 252—463 12 Claims

1. A method of preparing a porous solid contact material which comprises the steps of:

(a) immersing particles of a porous solid inorganic refractory carrier material in a polar organic presoak liquid so as to substantially completely fill the pores of the carrier, said presoak liquid being capable of wetting the carrier material and capable of displacement by the acid etching solution used in step (c) at a rate slow enough to permit control of the extent of acid attack;

(b) separating said carrier material from said presoak liquid;

(c) immersing said carrier material in an acid solution, said

acid solution being substantially immiscible with said presoak liquid;

(d) removing said acid solution from said carrier material;

(e) impregnating the acid solution treated carrier material with an impregnating solution containing a metal compound which is decomposable into a desired catalyst or sorbent;

(f) drying said carrier material and converting said decomposable metal compound to said desired catalytic or sorbing metal or metal oxide or a mixture of metals or metal oxides.

4,087,384

METHOD OF CATALYST PREPARATION FOR USE IN SUPPRESSING HYDROCARBON AND CARBON MONOXIDE EMISSION FROM INTERNAL COMBUSTION ENGINES

Robert E. Davis, 125 Hillcrest, Hinsdale, Ill.

Continuation-in-part of Ser. No. 631,043, Nov. 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 389,963, Aug. 20, 1973, Pat. No. 3,928,237, which is a continuation-in-part of Ser. No. 307,652, Nov. 17, 1972, abandoned. This application Dec. 20, 1976, Ser. No. 752,319

The portion of the term of this patent subsequent to Dec. 23, 1992, has been disclaimed.

Int. Cl.[2] B01J *23/42, 23/44*

U.S. Cl. 252—472 **4 Claims**

1. A method of preparing a catalyst precursor for use in suppressing hydrocarbon and carbon monoxide emission from internal combustion engines comprising the steps of:

a. contacting a first substrate with a solution of a platinum compound so that the first substrate absorbs platinum,

b. drying the first platinum-containing substrate,

c. contacting a second substrate with a solution of a palladium compound so that the second substrate absorbs palladium,

d. drying the second palladium-containing substrate, and

e. mixing the first platinum-containing substrate and the second palladium-containing substrate whereby a platinum and palladium containing catalyst precursor is formed which can be activated to provide a catalytically reactive catalyst by heating the catalyst precursor.

4,087,385

PROCESS FOR MAKING A SILVER CATALYST FOR OXIDIZING ETHYLENE TO ETHYLENE OXIDE

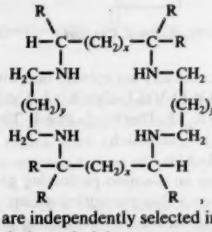
Walter Lesley Wernli, Angleton, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 23, 1977, Ser. No. 780,220

Int. Cl.[2] B01J *23/02, 23/14, 23/50, 23/52*

U.S. Cl. 252—475 **5 Claims**

1. In a process for making a supported silver catalyst in which soluble silver compound is impregnated onto a support from an aqueous solution thereof, subsequently dried and reduced to metallic silver, the improvement of adding to said aqueous solution a compound selected from the group of cyclic tetraamines having the formula



wherein *x* and *y* are independently selected integers of either 0 or 1 and R is methyl or ethyl, in an amount of from about 5 to about 20 percent by weight based on the weight of silver employed.

4,087,386

TRIARYL PHOSPHATE ESTER FUNCTIONAL FLUIDS

Harry Dounchis, Trenton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 564,847, Apr. 3, 1975, Pat. No. 3,992,309, which is a continuation-in-part of Ser. No. 490,767, Jul. 20, 1974, Pat. No. 3,931,023. This application Jul. 19, 1976, Ser. No. 706,514

Int. Cl.[2] C10M *3/40, 3/30*

U.S. Cl. 252—49.8 **3 Claims**

1. A lubricant characterized by improved thermal and oxidation stability comprising as a base stock 95–99.9% by weight of a polyol alkanoic acid ester, and in admixture with the base stock about 5 to 0.1% by weight of a mixed liquid tertiary-butylphenyl/phenyl phosphate containing from about 15 to 60% by weight mono-t-butylphenyl radicals, or mixtures of mono-tbutylphenyl and di-t-butylphenyl radicals.

2. A lubricant characterized by improved thermal and oxidation stability comprising as the base stock 95–99.9% by weight of a silicone fluid, and in admixture with the base stock about 5 to 0.1% by weight of a mixed liquid tertiary-butylphenyl,'-phenyl phosphate containing from about 15 to 60% by weight mono-t-butylphenyl radicals, or mixtures of mono-t-butylphenyl and di-t-butylphenyl radicals.

3. A lubricant characterized by improved thermal and oxidation stability comprising 5 to 0.1% by weight of a mixed liquid tertiary-butylphenyl/phenyl phosphate containing from about 15 to 60% by weight mono-t-butylphenyl radicals, or mixtures of mono-t-butylphenyl and di-t-butylphenyl radicals and 95–99.9% by weight of a different phosphate ester selected from the group consisting of triaryl phosphates, trialkyl phosphates, alkyl substituted triaryl phosphates, and other mixed alkyl phenyl/phenyl phosphates.

4,087,387

FOAM CLEANING COMPOSITION

Albert Willems, Maarssen, and Wilhelmus Gerardus Galesloot, Leersum, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 483,198, Jun. 26, 1974, abandoned. This application May 10, 1976, Ser. No. 684,815

Claims priority, application United Kingdom, Jul. 10, 1973, 32849/73

Int. Cl.[2] C11D *1/88, 1/86, 3/08*

U.S. Cl. 252—524 **5 Claims**

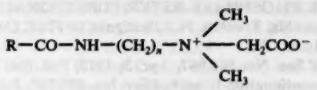
1. A non-corrosive liquid foam cleaning composition for the production of foam specially adapted for cleaning the interiors of cars, train-wagons, ships, aircraft and buildings, consisting essentially of an aqueous solution of:

(a) from 4 to 15 parts by weight of a high foaming alkali metal, ammonium or amine salt of an alkyl benzene sulphonic acid, in which the alkyl group contains from 8 – 16 carbon atoms;

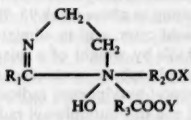
(b) from 1 to 10 parts by weight of an alkali metal, ammonium or amine salt of an alkyl sulphuric acid, in which the alkyl group is straight-chained or branched-chained and contains from 8 – 18 carbon atoms;

(c) from 2 to 10 parts by weight of a nonionic ethoxylate selected from the group consisting of nonionic alkylphenol polyethers of the general formula $R\text{-}C_6H_4\text{-}O(C_2H_4O)_nH$, where R is an alkyl group having from 6 – 16 carbon atoms; nonionic condensates of fatty acids and ethylene oxide of the general formula $R\text{-}CO\text{-}O\text{-}(C_2H_4O)_nH$, where R is an alkyl group having 12 – 22 carbon atoms and *n* is an integer of from 8 to 20; nonionic condensates of higher straight-chained or branched-chained primary or secondary alcohols and ethylene oxide of the general formula $R\text{-}O(C_2H_4O)_nH$, where R is a hydrocarbon group having 10 – 20 carbon atoms and *n* is an integer of from 8 to 20, and mixtures thereof;

(d) from 0.5 to 5 parts by weight of an amphoteric detergent selected from the group consisting of amido alkylbetaines having the general formula:



where R is a C_7–C_{17} alkyl or alkyl aromatic group, and *n* is 2 - 3; imidazoline compounds having the general formula:



in which R_1 is a hydrocarbon radical having from 4 to 8 carbon atoms, R_2 is a hydrocarbon radical having 1 - 4 carbon atoms, R_3CO is an acyl radical having 1 - 4 carbon atoms, X is Na, K, H, $—CH_2COONa$, $—CH_2COOK$ or $—CH_2COOH$, and Y is H, Na or K, or mixtures thereof;

(e) from 1 to 8 parts by weight of a solubiliser selected from the group consisting of alkali metal or ammonium salts of toluene sulphonic acid and xylene sulphonic acid;

(f) from 2 to 15 parts by weight of a low molecular weight alcohol comprising 2 - 4 carbon atoms;

(g) from 0.5 to 7.5 parts by weight of an organic builder selected from the group consisting of the alkali metal salts of gluconic acid, ethylene diamine tetraacetic acid, and nitrilotriacetic acid, and mixtures thereof;

(h) from 0 to 2 parts by weight of sodium metasilicate, said aqueous solution having a pH value of 7 - 11.

4,087,388

PROCESS OF PREPARING A PERMSELECTIVE MEMBRANE

James Henry Jensen, and Lynn E. Applegate, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 21, 1976, Ser. No. 734,632
Int. Cl.[2] C08J *9/26*
U.S. Cl. 260—2.5 M **16 Claims**

1. In the process for preparing a permselective membrane, which comprises extracting an unextracted membrane comprising

A. a water-miscible organic polar aprotic solvent present in the unextracted membrane in an amount of between about 20% and about 75% by weight based on weight of unextracted membrane;

B. a substantially linear, aromatic, synthetic, organic, nitrogen-linked, condensation polymer present in the unextracted membrane in an amount of between about 25% and about 80% by weight based on total weight of the unextracted membrane;

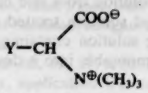
C. at least one salt which is soluble in the solvent and is present in the unextracted membrane in an amount of between about 10 and about 100% by weight based on weight of polymer;

with a rinse medium which is miscible with the solvent, is a solvent for the salt, is practically chemically inert toward the polymer and is practically a nonsolvent for the polymer; the improvement which comprises employing in the rinse medium between about 50 p.p.m. and 10,000 p.p.m. of a surfactant having a molecular weight between about 200 and about 7000, and containing (a) at least one hydrophobic moiety having a molecular weight of between about 100 and about 400 and being a hydrocarbyl group or such a hydrocarbyl group substituted with halogen (F, Cl, Br or I), $—NO_2$ or —OH; and (b) at least one hydrophilic moiety, said surfactant being

i. a nonionic surfactant or;

ii. an anionic surfactant or;

iii. an amphotylic surfactant of the formula



(1)

wherein Y is hydrocarbyl of between about 6 and about 20 carbon atoms which can be substituted with halogen, $—NO_2$ or —OH.

4,087,389

SEMI-RIGID POLYURETHANE FOAM USED IN PACKAGING

Pasquale J. Coppola, Meriden, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Apr. 19, 1976, Ser. No. 678,298
Int. Cl.[2] C08G *18/06, 18/12*
U.S. Cl. 260—2.5 AP **14 Claims**

1. A semi-rigid polyurethane foam prepared from a reaction mixture having an over-all index from about 30 to about 60, which mixture comprises:

a. a polyether polyol characterized by (1) a molecular weight of at least 4,000, (2) a polyhydroxy alcohol nucleus having a functionability of 2–4, (3) polyoxyalkylene chain segments attached to said nucleus and (4) a ratio of primary to secondary hydroxy groups ranging from about 1:1 to about 6:1.

b. a polymeric polyisocyanate,

c. water in a proportion of about 12–28 parts per every 100 parts by weight of total polyol in said mixture,

d. a halogenated hydrocarbon foaming agent in a proportion of about 30–60 parts per every 100 parts by weight of total polyol in said mixture,

e. an amine catalyst, and

f. a non-hydrolyzable silicon-based surfactant in a proportion of about 1.5–3.2 parts per every 100 parts by weight of total polyol in said mixture.

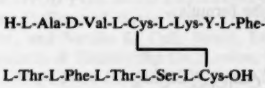
4,087,390

SOMATOSTATIN ANALOGS AND INTERMEDIATES THERETO

James E. Shields, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 2, 1977, Ser. No. 763,944
Int. Cl.[2] C07C *103/52;* C08L *89/00;* A61K *37/00*
U.S. Cl. 260—8 **19 Claims**

1. A compound selected from those of the formula



and their pharmaceutically acceptable non-toxic acid addition salts, and R-L-Ala-D-Val-L-Cys(R_1)-L-Lys(R_2)-Y-L-Phe-L-D-Trp(R_3)-L-Lys(R_2)-L-Thr(R_3)-L-Phe-L-Thr(R_3)-L-Ser(R_4)-L-Cys(R_1)-X; in which

Y is L-Asn or L-Ala;

R is hydrogen or an α-amino protecting group;

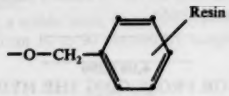
R_1 is hydrogen or a thio protecting group;

R_2 is hydrogen or an ε-amino protecting group;

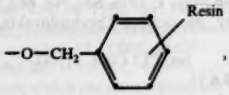
R_3 and R_4 each are hydrogen or a hydroxy protecting group;

R_5 is hydrogen or formyl; and

X is hydroxy or



in which the resin is polystyrene; with the proviso that, when X is hydroxy, each of R, R_1, R_2, R_3, R_4, and R_5 is hydrogen, and, when X is



each of R, R_1, R_2, R_3, and R_4 is other than hydrogen.

4,087,391

ION-EXCHANGER ALKYLSULPHONATED PHENOXY POLYMERS FOR MEMBRANES

Jean-Pierre Quentin, Lyon, France, assignor to Rhone-Poulenc Industries, Paris, France

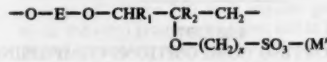
Filed Oct. 8, 1976, Ser. No. 730,989

Claims priority, application France, Oct. 15, 1975, 75 32226; Jun. 11, 1976, 76 18864

Int. Cl.² B01D *13/00*

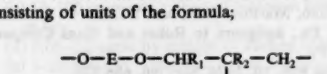
U.S. Cl. 260—2.2 R **29 Claims**

1. A polymer having ion exchange properties containing units of the formula:



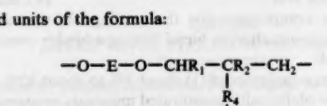
(I)

alone or in combination with units selected from the class consisting of units of the formula;



(II)

and units of the formula:



(IV)

in which:

R_1 and R_2, which may be identical or different, represent a hydrogen atom or a methyl radical;

R_4 represents a radical such as —O— or —O—R_5—O;

R_5 represents an organic radical of valency at least equal to 2;

E represents a divalent radical consisting of the nucleus system of a polynuclear diphenol in which the hydroxyl groups are attached to different nuclei;

x and n are positive integers; and

M^{n+} represents a cation of valency n.

4,087,392

MANUFACTURE OF PRESSURE-SENSITIVE ADHESIVES

Heinrich Hartmann, Limburgerhof; Wolfgang Druschke, Dirmstein; Klaus Eisentraeger, Ludwigshafen, and Helmut Mueller, Kaiserslautern, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Jul. 3, 1975, Ser. No. 592,810

Claims priority, application Germany, Jul. 31, 1974, 2436873

Int. Cl.² C08G *18/80*

U.S. Cl. 260—24 **7 Claims**

1. A process for the manufacture of pressure-sensitive adhesive, in which

a. from 10 to 90% by weight of a polyol having a molecular weight of from 300 to 8,000 and a hydroxyl number of from 20 to 85 and

b. from 5 to 60% by weight of an amorphous, thermoplastic tackifier having a softening point between 40 and 140° C and a molecular weight between 200 and 7,500,

are mixed together and the mixture is reacted with

c. from 5 to 30% by weight of a polyisocyanate masked with CH acidic compounds,

the percentages being based on the total weight of components (a), (b) and (c).

4,087,393

NON-AQUEOUS RESIN DISPERSION AND METHOD OF MANUFACTURING THEREOF

Kazuo Tsubuko; Kenichi Matsubayashi, and Tsuneo Kurotori, all of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

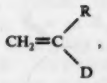
Filed Nov. 8, 1976, Ser. No. 739,523

Claims priority, application Japan, Nov. 20, 1975, 50-139392

Int. Cl.² C08K *5/01, 5/02;* C08L *93/00*

U.S. Cl. 260—27 R **29 Claims**

1. A non-aqueous resin dispersion comprising a non-aqueous solvent selected from the group consisting of aliphatic hydrocarbons and halogen derivatives thereof, at least one resin which is substantially insoluble in said solvent, said resin being selected from the group consisting of natural resins and natural resin-modified thermosetting resins, and a polymer obtained by polymerizing at least one monomer A, wherein said monomer A has the formula



wherein R is hydrogen or CH_3, D is —$COOC_nH_{2n+1}$ or —OC_nH_{2n+1} or and n is an integer ranging from 6 to 20, and which monomer A is capable of dissolving said resin, the weight ratio of said resin: said polymer being in the range of from about 5–50:50–95, said polymer being solvated with said solvent.

4,087,394

AQUEOUS DISPERSIONS OF PERFLUOROOLEFIN POLYMERS CONTAINING FILM-FORMING MATERIALS

Thomas Patrick Concannon, Newtown Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 546,999, Feb. 4, 1975, abandoned. This application Nov. 10, 1976, Ser. No. 742,533

Int. Cl.² C08L *27/18*

U.S. Cl. 260—29.6 F **27 Claims**

1. An aqueous dispersion coating composition wherein the dispersed phase consists essentially of:

(A) 20 to 80% by weight, based on the weight of (A) plus (B), of a perfluoroolefin polymer containing 5 to 100% by weight, based on the perfluoroolefin polymer, of tetraflu-

oroethylene and 95 to 0% by weight, based on the perfluoroolefin polymer, of hexafluoropropylene; and

(B) 80 to 20% by weight, based on the weight of (A) plus (B), of a film-forming material, said film-forming material being capable of forming a film below the fusion point of the perfluoroolefin polymer and does not decompose at the film forming temperature of said dispersion; wherein the coating resulting from said aqueous dispersion is not uniform in composition throughout its thickness but is composed predominantly of the film-forming material at the substrate-film interface and of the perfluoroolefin polymer at the film-air interface.

4,087,395

WATER-DISPERSIBLE THERMOSETTABLE CATIONIC RESINS FROM REACTION OF (1) WATER SOLUBLE AMINO POLYAMIDE, (2) ACID ANHYDRIDE AND (3) EPIHALOHYDRIN

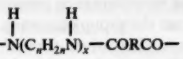
Paul Harwood Aldrich, Greenville, and David Howard Dumas, Wilmington, both of Del., assignors to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 572,597, Apr. 28, 1975, abandoned, which is a division of Ser. No. 393,690, Aug. 31, 1973, Pat. No. 3,922,243. This application Apr. 13, 1977, Ser. No. 787,131

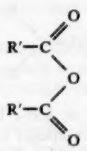
Int. Cl.[2] C08L *77/06*

U.S. Cl. 260—29.2 EP **8 Claims**

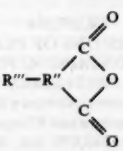
1. A composition consisting essentially of an aqueous dispersion of a water-insoluble, water-dispersible thermosettable cationic resin derived by reacting (I) an epihalohydrin and (II) a water-insoluble modified aminopolyamide derived by reacting (a) a water-soluble long chain aminopolyamide derived by reaction of a polyalkylenepolyamine and a dicarboxylic acid, said aminopolyamide having recurring groups.



wherein n is an integer 2 through 6, x is an integer 2 through 4, and R is a divalent hydrocarbon radical, and (b) an acid anhydride selected from the group consisting of (1) an anhydride having the formula



wherein R′ is a hydrocarbon radical containing a total of from about 11 to about 39 carbon atoms and (2) an anhydride having the formula



where R″ is dimethylene or trimethylene and R‴ is a hydrocarbon radical containing from 8 through 22 carbon atoms, the amount of acid anhydride employed being that sufficient to provide a modified aminopolyamide that is water-insoluble but insufficient to react with more than about 50% of the secondary amine groups of the aminopolyamide, the amount of epihalohydrin employed being at least that amount sufficient to react with substantially all the secondary amine groups of the modified aminopolyamide.

4,087,396

METHOD FOR PRODUCING THE HYDROPHILIC FILLER FOR PLASTICS

Slavko Hudecek; Ivana Gavrilová; Miroslav Beran, all of Prague, and Frantisek Juracka, Pardubice, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Filed Mar. 1, 1976, Ser. No. 662,711

Claims priority, application Czechoslovakia, Mar. 5, 1975, 1472/75

Int. Cl.[2] C08L *31/00*

U.S. Cl. 260—29.6 H **11 Claims**

1. A method for producing powdered hydrophilic plastic filler comprising the steps of polymerizing a (1) mixture of polymerizable monomers (a) at least one of which contains from one to two carboxylic groups and is selected from the group consisting of methacrylic acid, acrylic acid, fumaric acid, maleic acid, maleic anhydride, alpha-ethylacrylic acid, citraconic acid, crotonic acid, α-chlorocrotonic acid, mesaconic acid, itaconic acid and ethylmaleic acid and (b) another of which contains at least two vinyl groups and is selected from the group consisting of ethylene glycol dimethacrylate, ethylene glycol diacrylate, diethylene glycol dimethacrylate, glycol divinyl ether, divinyl adipate, alkyl vinyl ether, dialkyl fumarate, divinyltoluene, trivinylbenzene, divinylnaphthalene, triallyl cyanurate and divinylbenzene, in a (2) medium selected from the group consisting of (a) a plasticizer, (b) a mixture of a plasticizer and up to 2 wt.%, based on the weight of said filler, of a member selected from the group consisting of (i) saturated higher fatty acids having 12 to 18 carbon atoms, (ii) unsaturated higher fatty acids having 18 carbon atoms, (iii) higher alcohols having 8 - 16 carbon atoms and (iiii) mixtures of said higher alcohols, in (3) the presence of a radical polymerization initiator, thereafter converting said resulting polymer without isolation to the Na, K or NH_4 form, reducing the content of said plasticizer in said converted polymer to 20 - 70% by weight of said polymer until said polymer is a dry power.

4,087,397

AQUEOUS COATING COMPOSITIONS COMPRISING ACRYLIC OLIGOMERS AND HIGH MOLECULAR WEIGHT POLYMERS

Richard Martorano, Marlton, N.J., and William H. Brendley, Jr., Hatboro, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Feb. 10, 1976, Ser. No. 656,928

Int. Cl.[2] C08L *33/04*

U.S. Cl. 260—29.6 WB **14 Claims**

1. A polymer composition for the coating of substrates, comprising an aqueous alkaline blend having a binder consisting essentially of:

(A) an addition copolymer of (1) about 3% to about 30% by weight of an olefinically unsaturated monomer containing a carboxyl group or mixture thereof, (2) at least one ester of acrylic or methacrylic acid, and, optionally, (3) other olefinically unsaturated monomers, the total of (1), (2) and (3) being 100%, the weight average molecular weight of the copolymer being between 10,000 and 500,000 in the form of a solution or a colloidal solution in an aqueous phase;

(B) an oligomeric addition copolymer of (1) at least one ester of acrylic or methacrylic acid, (2) about 9% to about 50% of an olefinically unsaturated monomer having at least one carboxyl group, and, optionally, (3) other olefinically unsaturated monomers, the total of (1), (2) and (3) being 100%, the weight average molecular weight of the copolymer being between 400 and 6000, the molecular

weight distribution is such that the heterogeneity index is 3 or less; and

is the blend, on a solids basis, (A) being from 90 to 10 percent and (B) being from 10 to 90 percent by weight.

4,087,398

ANTIFOAM COMPOSITIONS

Rudi Heyden, Erkrath; Adolf Asbeck, and Michael Eckelt, both of Dusseldorf, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA), Dusseldorf-Holthausen, Germany

Filed Nov. 29, 1976, Ser. No. 745,839

Claims priority, application Germany, Dec. 1, 1975, 2553990

Int. Cl.² C08L *33/08*

U.S. Cl. 260—29.6 R **36 Claims**

36. A latex paint which contains a small but effective amount as anti-foam agent of a dispersion, wherein the continuous phase is a liquid having s solidification point below 5° C. and a boiling point above 80° C. and wherein the dispersed phase comprises at least 1% based on the weight of said dispersion of a higher aliphatic component selected from the group consisting of the C_{22-70} aliphatic ketones, C_{22-70} aliphatic secondary alcohols, and mixtures thereof, said continuous phase being substantially a non-solvent for said aliphatic component; the size of the particles of said dispersed phase being such that the dispersion does not separate on standing for two weeks at 20° C.; the amount of said dispersed phase being such that said dispersion is fluid at 40° C.

4,087,399

SELF-EXTINGUISHING SILICONE ELASTOMER COMPOSITIONS

Mitsuo Hamada; Hiroshi Honma, and Shoichi Kato, all of Ichihara, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

Filed Jul. 11, 1977, Ser. No. 814,509

Int. Cl.² C08L *83/04*

U.S. Cl. 260—37 SB **6 Claims**

1. A self-extinguishing silicone elastomer consisting of

(a) 100 parts by weight of a curable organopolysiloxane which contains organic groups directly bonded to silicon atoms, which organic groups are selected individually from methyl, phenyl or vinyl groups such that there are an average of 1.98 to 2.02 such organic groups per silicon atom, the vinyl groups are present in 0 to 2 percent and the phenyl groups are present in 0 to 10 percent based on the number of organic groups in (*a*);

(b) 10–100 parts by weight of finely divided silica;

(c) 10–100 parts per million of platinum based on the weight of (*a*);

(d) 0.05–2.0 parts by weight of carbon black;

(e) 1–20 parts by weight of fumed titanium dioxide, and

(f) 0.05–1.0 parts by weight of a triazole compound.

4,087,400

SHEET VINYL FLOORING SEAM SEALING COMPOSITION

David B. Skinner, Allentown, Pa., assignor to GAF Corporation, New York, N.Y.

Filed Jul. 28, 1975, Ser. No. 599,661

Int. Cl.² C08K *5/15*

U.S. Cl. 260—30.4 N **9 Claims**

1. A sheet vinyl flooring seam sealing composition for joining sections of sheet vinyl flooring having high gloss polyurethane wear layers which comprises:

a. between about 10 and about 75 wt% uncured polyurethane.

b. between about 20 and about 85 wt% tetrahydrofuran; and

c. between about 5 and about 60 wt% of an organic solvent for the uncured polyurethane, said solvent having an evaporation rate less than about 95% of the evaporation rate of the tetrahydrofuran in the composition and being selected from the group consisting of toluene, xylene, methyl ethyl ketone, isopropanol and methyl isobutyl ketone.

4,087,401

SILICA FLOUR CONTAINING REINFORCED RESIN COMPOSITIONS AND ARTICLES FORMED THEREOF

Vance A. Stayner, P.O. Box 63, Sugar Grove, Ill. 60554

Filed Jul. 12, 1976, Ser. No. 704,300

Int. Cl.² C08K *3/36, 7/00, 7/20*

U.S. Cl. 260—40 R **5 Claims**

1. A hardenable composition consisting essentially of about 10 to 60 percent by weight of a curable, synthetic polyester resin, about 1 to 30 percent by weight of microscopically sized glass spheres, about 10 to 60 percent by weight of Suzorite mica platelets, and about 20 to 70 percent by weight of silica flour particles.

4,087,402

ORGANO-TITANATE CHELATES AND THEIR USES

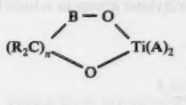
Salvatore J. Monte, Staten Island, N.Y., and Gerald Sugerman, Allendale, N.J., assignors to Kenrich Petrochemicals, Inc., Bayonne, N.J.

Continuation-in-part of Ser. No. 618,222, Sep. 30, 1975, abandoned. This application Apr. 19, 1976, Ser. No. 677,980

Int. Cl.² C08K *9/00*

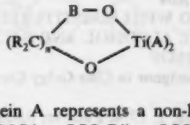
U.S. Cl. 260—42.14 **20 Claims**

1. An organo alpha, omega-alkylene titanate having the formula:



wherein A represents a non-hydrolyzable aroxy, thioaroxy, —OCOR′, —OSO_2R'', —OSOR″, $(R''O)_2P(O)OP(OH)(O)$—, or $(R''O)_2P(O)O$-group; B is an R_2C group or a carbonyl group; R is hydrogen or an alkyl group having from 1 to 6 carbon atoms; R′ and R″ are hydrogen or an alkyl, alkenyl, aryl, aralkyl or alkaryl group, or an alkyl, alkenyl, aryl, aralkyl, alkaryl, halo, amino, epoxy, ether, thioether, ester, cyano, carbonyl or aromatic nitro substituted derivative thereof; and *n* is 1 or 2.

20. A filled polymeric composition which comprises a polymeric material admixed with a comminuted inorganic material reacted with an organic alpha, omega-alkylene titanate having the formula:



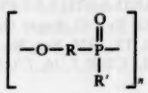
wherein A represents a non-hydrolyzable aroxy, thioaroxy, —OCOR′, —OSO_2R'', —OSOR″, $(R''O)_2P(O)OP(OH)(O)$—, or $(R''O)_2P(O)O$— group; B is an R_2C group or a carbonyl group; R is hydrogen or an alkyl group having from 1 to 6 carbon atoms; R′ and R″ are hydrogen or an alkyl, alkenyl, aryl, aralkyl, or alkaryl group, or an alkyl, alkenyl, aryl, aralkyl, alkaryl, halo, amino, epoxy, ether, thioether, ester, cyano, carbonyl or aromatic nitro substituted derivative thereof; and *n* is 1 or 2.

4,087,403
POLYPHOSPHINATE FLAME RETARDANTS

Kurt Moedritzer, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Mar. 1, 1976, Ser. No. 662,766
Int. Cl.[2] C08K 5/53
U.S. Cl. 260—45.7 P 11 Claims

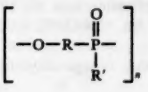
1. As compositions of matter, polyphosphinate resins corresponding to the general formula



wherein R is a phenylene naphthylene group in which the O substitutent is non-vicinal to the

group, R′ is an alkyl group of 1 to 15 carbon atoms or an aryl group of 6 to 15 carbon atoms, and *n* is from 5 to 50 units.

3. The combination of an organic polymer selected from the group consisting of linear polyesters, and polyamides having recurring amide groups as integral parts of the main polymer chain, together with a polyphosphinate resin corresponding to the general formula



wherein R is a phenylene or naphthylene group in which the O substituent is non-vicinal to the

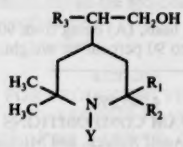
group, R′ is an alkyl group of 1 to 15 carbon atoms or an aryl group of 6 to 15 carbon atoms, and *n* is from 5 to 50 units.

4,087,404
POLYMERS STABILIZED WITH SUBSTITUTED 2-(PIPERIDINYL-4′)-ETHYL ALCOHOL AND SALTS THEREOF

Barry Cook, Flixton, England, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

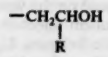
Division of Ser. No. 438,808, Feb. 1, 1974, Pat. No. 3,959,291.
This application May 19, 1976, Ser. No. 687,790
Claims priority, application United Kingdom, Feb. 3, 1973, 5470/73
Int. Cl.[2] C08K 5/34; C07D 211/22
U.S. Cl. 260—45.8 N 13 Claims

1. A composition comprising an organic material and, as stabiliser, a stabilizing amount of a compound having the formula:



I

and salts thereof, wherein R_1 and R_2 are the same or different and each is an alkyl residue having from 1 to 12 carbon atoms or R_1 and R_2, together with the carbon atom to which they are bound, form a cycloalkyl residue having from 5 to 12 carbon atoms in the ring, Y is O; hydrogen, a straight- or branched alkyl residue having from 1 to 20 carbon atoms, an alkenyl or alkynyl residue having from 3 to 12 carbon atoms, an aralkyl residue having from 7 to 12 carbon atoms or a group having the formula:



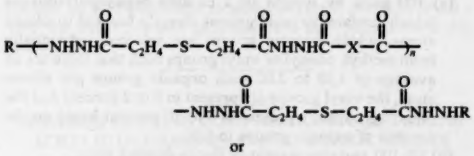
wherein R is hydrogen, or a methyl or phenyl residue and R_3 is hydrogen or a straight- or branched chain alkyl residue having from 1 to 12 carbon atoms.

4,087,405
POLYHYDRAZIDES AS STABILIZERS FOR POLYOLEFINS

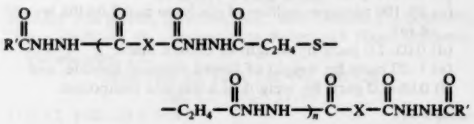
Richard H. S. Wang, and Gether Irick, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 26, 1977, Ser. No. 828,133
Int. Cl.[2] B07D 109/06; C07D 109/087; C08K 5/36; C08G 69/42
U.S. Cl. 260—45.9 NC 6 Claims

1. Polyhydrazide compounds useful as stabilizers in polyolefin compositions having the formulas



or



wherein

R is hydrogen or

R′ is alkyl having 1 to about 20 carbon atoms, benzyl, phenyl, phenyl substituted with alkyl having 1 to about 12 carbon atoms, hydroxy, or alkoxy having 1 to about 8 carbon atoms;

n is an integer of 1 to about 10; and

X is alkylene having 1 to about 8 carbon atoms, phenylene or phenylene substituted with methyl or hydroxy.

4. A composition comprising

(A) at least one poly-α-olefin;

(B) a stabilizing amount of a phenolic primary antioxidant; and

(C) a stabilizing amount of a compound of claim 1.

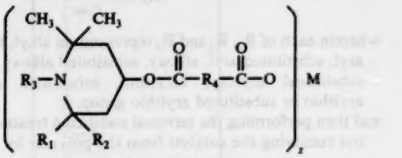
4,087,406

METAL SALTS OF HINDERED PIPERIDINE CARBOXYLIC ACIDS AND STABILIZED COMPOSITIONS

Chester E. Ramey, Spring Valley, and John J. Luzzi, Carmel, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 429,237, Dec. 28, 1973, Pat. No. 3,939,163. This application Jan. 19, 1976, Ser. No. 649,938
Int. Cl.² C08K 5/34
U.S. Cl. 260—45.75 N 18 Claims

1. A composition of matter stabilized against ultraviolet deterioration which comprises a synthetic organic polymer normally subject to ultraviolet deterioration containing from 0.005 to 5% of a stabilizing compound of the formula



wherein

R_1 and R_2 independently of each other are straight- or branched-chain alkyl having from 1 to 6 carbon atoms, or together with the carbon to which they are bound form a cyclopentyl or cyclohexyl ring, which is unsubstituted or unsubstituted with a methyl group,

R_3 is hydrogen, alkyl having 1 to 12 carbon atoms, β-methoxyethyl, alkenyl having 3 or 4 carbon atoms, propargyl, benzyl or alkyl substituted benzyl,

R_4 is straight- or branched-chain alkylene having 1 to 4 carbon atoms,

M is a selected from the group consisting of nickel, manganese, zinc, iron, cobalt, tin and dialkyl tin, and

z has the value of from 1 to 4, the value of z being the same as the available valence of M.

4,087,407

PROCESS FOR THE PRODUCTION OF EPOXY SILICATE FOAM

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 678,196, Apr. 19, 1976, Pat. No. 4,036,787. This application Aug. 4, 1977, Ser. No. 821,584
Int. Cl.² C08G 77/04; C07F 7/08, 7/10
U.S. Cl. 260—46.5 R 24 Claims

1. The process for the production of epoxy silicate foam by the following steps:

(a) adding about 0.5 to 4 parts by weight of a fine granular oxidated silicon compound;

(b) mixing therewith a catalylic amount of an organic amine compound;

(c) mixing therewith 3 to 4 parts by weight of an organic epoxy compound having at least one epoxy group;

(d) agitating the mixture while keeping the temperature between 25° to 70° C until the resulting chemical reaction is complete, thereby

(e) producing an epoxy silicate prepolymer;

(f) heating the epoxy silicate prepolymer to a temperature of 80° to 100° C while agitating until foaming begins, thereby

(g) producing an epoxy silicate foam.

4,087,408

BROMINE AND PHOSPHORUS CONTAINING POLYESTER

Kurt Moedritzer, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

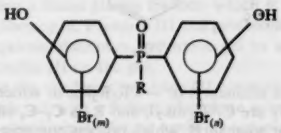
Filed Dec. 15, 1976, Ser. No. 750,756
Int. Cl.² C08G 63/18, 63/68
U.S. Cl. 260—47 P 8 Claims

1. A ternary polyester obtained by the copolymerization at a temperature of 200° C to 300° C of:

a. an aliphatic alcohol of 2 to 20 carbon atoms, and

b. an aromatic dicarboxylic acid of 6 to 20 carbon atoms, and

c. a brominated bisphenol alkyl or aryl phosphine oxide of the formula



in which the hydroxyl groups are present in either the para or meta positions, m plus n is from 1 to 8, and R is an alkyl radical of 1 to 10 carbon atoms, or an aryl radical of 6 to 10 carbon atoms, the said alcohol and acid being employed in essentially stoichiometric relationship, with the said brominated compound being employed as a partial equivalent of the aforesaid alcohol, to provide from 1 to 20 wt. % of the said brominated compound in the ternary polyester.

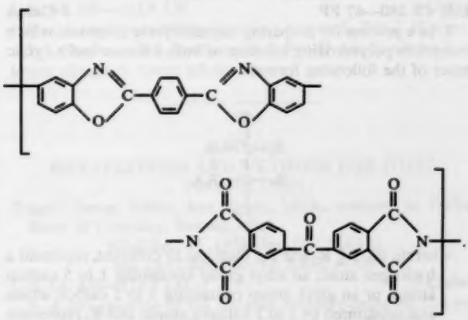
4,087,409

ORDERED HETEROCYCLIC COPOLYMERS

Jack Preston, Raleigh, N.C., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 592,347, Nov. 7, 1966, abandoned, which is a continuation-in-part of Ser. No. 296,395, Jul. 19, 1963, abandoned. This application Aug. 14, 1969, Ser. No. 850,262
Int. Cl.² C08G 69/26, 73/10, 73/22
U.S. Cl. 260—65 14 Claims

13. A linear heterocyclic polymer consisting essentially of recurring units of the formula



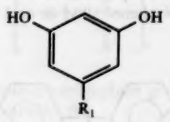
and having a degree of polymerization in excess of 10".

4,087,410
5-(TERTIARY ALKYL) RESORCINOL PREPARATION AND INTERMEDIATES THEREFOR

Samuel J. Dominianni, and Charles W. Ryan, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jun. 14, 1976, Ser. No. 695,674
Int. Cl.[2] C07C *39/06, 39/08, 39/12*
U.S. Cl. 568—766 **3 Claims**

1. A process for preparing a 5-(tertiary alkyl)resorcinol of the formula



wherein R_1 is adamantyl or $—CR_2R_3R_4$, in which R_2 and R_3 independently are C_1–C_6 alkyl, and R_4 is C_1–C_6 alkyl, phenyl, cyclohexyl or adamantyl; which process comprises:

A. reacting approximately equimolar quantities of 2,6-dimethoxyphenol and a tertiary carbinol of the formula R_1OH in the presence of an acid selected from the group consisting of methanesulfonic acid, sulfuric acid and paratoluenesulfonic acid, at a temperature from about 25° to about 80° C., to provide the corresponding 2,6-dimethoxy-4-(tertiary alkyl) phenol;

B. reacting the 2,6-dimethoxy-4-(tertiary alkyl)phenol with about an equimolar quantity of a halogenated disubstituted phosphite to provide the corresponding 2,6-dimethoxy-4-(tertiary alkyl)phenyl disubstituted phosphate;

C. reacting the 2,6-dimethoxy-4-(tertiary alkyl)phenyl disubstituted phosphate with about a two molar quantity of an alkali metal in liquid ammonia to afford the corresponding 1-(tertiary alkyl)-3,5-dimethoxybenzene;

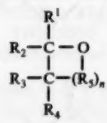
D. reacting the 1-(tertiary alkyl)-3,5-dimethoxybenzene with a demethylating agent selected from the group consisting of pyridine hydrochloride, boron tribromide, boron trichloride, aluminum bromide, aluminum chloride, and hydrobromic acid in acetic acid, to afford the corresponding 5-(tertiary alkyl)resorcinol, and recovering said product therefrom.

4,087,411
PROCESS FOR PREPARING OXYMETHYLENE POLYMERS

Akitoshi Sugio, Ohmiya; Yoshiharu Ohtsuki, Urawa; Toshikazu Umemura, and Makoto Mizutani, both of Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Japan

Filed Sep. 13, 1976, Ser. No. 722,671
Claims priority, application Japan, Sep. 17, 1975, 50-112297; Sep. 17, 1975, 50-112298; Nov. 5, 1975, 50-132546
Int. Cl.[2] C08G *2/28, 2/10*
U.S. Cl. 260—67 FP **8 Claims**

1. In a process for preparing oxymethylene polymers which comprises polymerizing trioxane or both trioxane and a cyclic ether of the following formula



wherein R_1, R_2, R_3 and R_4, identical or different, represent a hydrogen atom, an alkyl group containing 1 to 5 carbon atoms, or an alkyl group containing 1 to 5 carbon atoms and substituted by 1 to 3 halogen atoms; and R_5 represents a methylene group, a methylene group substituted by an alkyl group, a methylene group substituted by a haloalkyl group, an oxymethylene group, an oxymethylene group substituted by an alkyl group or an oxymethylene group substituted by a haloalkyl group, in which case n is 0 or an integer of 1 to 3, the substituent alkyl group is an alkyl group containing 1 to 5 carbon atoms and the substituent haloalkyl group is an alkyl group containing 1 to 5 carbon atoms and substituted by 1 to 3 halogen atoms, or R_5 alternatively represents $—(CH_2)_m—$ $OCH_2—$, or $—(OCH_2—CH_2)_m—OCH_2—$ in which m is an integer of 1 to 3, in which case n is 1,

in the presence of a catalytic amount of a boron fluoride-type catalyst, stopping the polymerization, and then subjecting the resulting polymer to a terminal stabilizing treatment, the improvement which comprises stopping the polymerization by adding a trivalent organic phosphorous compound of the following formula

wherein each of R_1, R_2 and R_3 represents an alkyl, haloalkyl, aryl, substituted aryl, alkoxy, substituted alkoxy, aryloxy, substituted aryloxy, alkylthio, substituted alkylthio, arylthio or substituted arylthio group,

and then performing the terminal stabilizing treatment without removing the catalyst from the polymer by washing.

4,087,412
ORGANOTIN CATALYST SYSTEM FOR ISOCYANATE REACTIONS

James D. Groves, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 11, 1976, Ser. No. 685,301
Int. Cl.[2] C08G *18/24*
U.S. Cl. 260—75 NB **8 Claims**

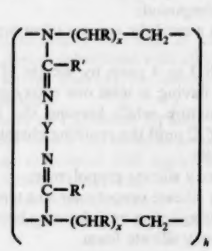
1. An organotin catalyst system for catalyzing the formation of urethane compounds comprising a catalytic amount of a mixture of a bis(tri-n-alkyl tin)oxide and the reaction product of a dialkyl tin oxide with a carboxylic acid, wherein the concentration ratio of said reaction product to said bis(tri-n-alkyl tin)oxide is from about 5.0 to 1 to about 0.1 to 1.

4,087,413
CROSSLINKED, LINEAR, ACYLATED POLYALKYLENEPOLYAMINES AND PROCESS THEREFOR

Jacqueline S. Kelyman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

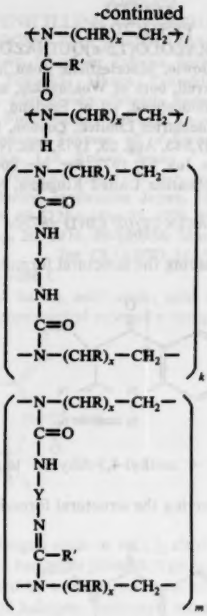
Filed Mar. 7, 1977, Ser. No. 775,342
Int. Cl.[2] C08G *18/00*
U.S. Cl. 260—77.5 CH **23 Claims**

1. A water-insoluble, crosslinked, linear, acylated polyalkylenepolyamine consisting essentially of n randomly joined units of the formulae



(A)

-continued



(B)

(C)

(D)

(E)

wherein

R is hydrogen or C_1–C_3 alkyl;

R′ is hydrogen, phenyl, C_1–C_{18} alkyl or an inertly-substituted phenyl or C_1–C_{18} alkyl;

Y is arylene, C_1–C_{10} alkylene, C_5–C_7 cycloalkylene or an inertly-substituted derivative thereof;

x is 1 or 2;

n is an integer of at least 4;

i is an integer of at least 1; and

j, *h*, *k* and *m* are independently integers of at least 0 with the provisos that

(a) $h+k+m$ is between about 2 percent and about 80 percent of *n*,

(b) $(i/2)+(j/2)$ is between about 20 percent and about 98 percent of *n*, and

(c) $h+(i/2)+(j/2)+k+m = n$.

4,087,414

PROCESS FOR PRODUCING A FLAME RETARDANT ISOCYANURATE RESIN

Seiichi Kamiyama; Norio Nagai, both of Tokyo, and Hiroaki Miyamoto, Matsudo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Sep. 10, 1976, Ser. No. 722,018

Claims priority, application Japan, Sep. 16, 1975, 50-111877

Int. Cl.² C08G *18/00*

U.S. Cl. 260—77.5 NC **9 Claims**

1. A process for producing a flame retardant isocyanurate resin by polymerizing an isocyanate compound having a plurality of isocyanate groups in the presence of an organic isocyanate polymerization catalyst, which process comprises polymerizing an epoxy compound having a plurality of epoxy groups with an isocyanate compound which is at least one member selected from the group consisting of hexamethylene diisocyanate, decamethylene diisocyanate, xylylene diisocyanate, phenylene diisocyanate, tolylene diisocyanate, biphenyl diisocyanate, toluidine diisocyanate, naphthylene diisocyanate, diphenylmethane diisocyajate, diphenyl ether diisocyanate, triphenylmethane triisocyanate, and polymethylene polyphenylisocyanate, in a ratio of 0.05–0.2 equivalent of the epoxy compound per equivalent of the isocyanate compound at a pressure of from 10 to 800 Kg/cm² (gauge) at a temperature of from 100° to 250° C.

4,087,415

ANTITHROMBIN III

Rodger L. Bick, Los Angeles, and Lajos F. Fekete, Costa Mesa, both of Calif., assignors to William L. Wilson; Rodger L. Bick and Lajos F. Fekete, all of Santa Monica, Calif.

Filed Jun. 9, 1976, Ser. No. 694,167

Int. Cl.² A23J *1/06*

U.S. Cl. 260—112 B **4 Claims**

1. A process for recovering clinically usable antithrombin III comprising:

(a) admixing a blood plasma fraction which is substantially free of fibrinogen, Factor VIII and prothrombin complex with aqueous aluminum hydroxide gel to adsorb crude antithrombin III on the gel;

(b) treating the crude antithrombin III-containing aluminum hydroxide gel with a sodium phosphate solution containing an aluminum chelating agent to separate the crude antithrombin III in the supernate remaining therefrom;

(c) treating said supernate with an ethylene oxide-propylene oxide block copolymer or polyethylene glycol protein precipitating agent to separate purified antithrombin III in the supernate remaining therefrom; and

(d) separating and recovering the thus purified antithrombin III.

4,087,416

NEW HEPTAPEPTIDES AND METHODS FOR THEIR PRODUCTION

Francis John Tinney, and Ernest D. Nicolaides, both of Ann Arbor, Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Filed Nov. 5, 1976, Ser. No. 739,163

Int. Cl.² C07C *103/52*; A61K *37/00*

U.S. Cl. 260—112.5 LH **7 Claims**

1. A heptapeptide having the name N^{α}-t-butoxycarbonyl-L-prolyl-N^{im}-benzyl-L-histidyl-N^{im}-benzyl-L-histidyl-O-benzyl-L-tyrosyl-O-benzyl-L-seryl-L-tryptophyl-D-alanine methyl ester.

4,087,417

HEXAPEPTIDES AND METHODS FOR THEIR PRODUCTION

Francis John Tinney, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Sep. 15, 1976, Ser. No. 723,426

Int. Cl.² C07C *103/52*; A61K *37/00*

U.S. Cl. 260—112.5 LH **3 Claims**

1. A hexapeptide of the formula t-butoxy-L-Trp-L-His(benzyl)-L-Ser(benzyl)-L-Tyr(benzyl)-L-Pro-D-Ala-Y where Y is lower alkoxy or lower alkylamino.

4,087,418

HEXAPEPTIDES AND METHODS FOR THEIR PRODUCTION

Eugene Leroy Wittle, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Sep. 15, 1976, Ser. No. 723,425

Int. Cl.² C07C *103/52*; A61K *37/00*

U.S. Cl. 260—112.5 LH **3 Claims**

1. A hexapeptide of the formula t-butoxy-carbonyl-L-Ser(-benzyl)-L-Tyr(benzyl)-D-Ala-L-Leu-L-Arg-L-Pro-N-lower alkylamide and acid addition salts thereof.

4,087,419

HEPTAPEPTIDES AND METHODS FOR THEIR PRODUCTION

Francis John Tinney, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Nov. 5, 1976, Ser. No. 739,164
Int. Cl.[2] C07C *103/52;* A61K *37/00*
U.S. Cl. 260—112.5 LH 3 Claims

1. A heptapeptide of the formula t-butoxy-L-Ser (benzyl)-L-Tyr(benzyl)-D-Phe-L-Leu-L-Arg(R)-L-Pro-Gly-lower alkoxy where R is nitro or (4-methylphenyl)sulfonyl.

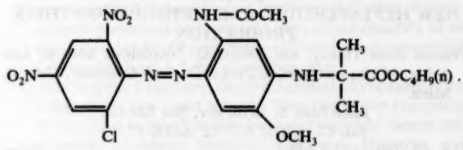
4,087,420

AZO DYESTUFFS CONTAINING AN α-PHENYLAMINO ISOBUTYRIC ACID ALKYL ESTER COUPLING COMPONENT

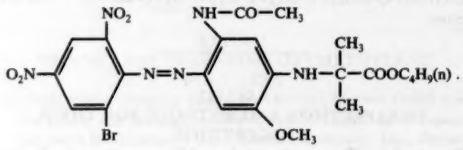
Ernst Heinrich, Frankfurt am Main; Jachim Ribka, Offenbach am Main, and Joachim Valentin, Frankfurt am Main, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 529,736, Dec. 5, 1974, abandoned, which is a continuation of Ser. No. 410,804, Oct. 29, 1973, abandoned. This application Nov. 7, 1975, Ser. No. 630,007
Claims priority, application Germany, Nov. 4, 1972, 2254017
Int. Cl.[2] C09B *29/08, 29/26*
U.S. Cl. 260—207 2 Claims

1. The water-insoluble azo dyestuff of the formula



2. The water-insoluble azo dyestuff of the formula



4,087,421

SUBSTITUTED BENZODIAZEPINES AND METHOD OF USE

Sidney Robert Safir, River Edge, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 678,262, Apr. 19, 1976, abandoned, which is a division of Ser. No. 552,022, Feb. 24, 1975, Pat. No. 3,951,981. This application Jan. 27, 1977, Ser. No. 762,911
The portion of the term of this patent subsequent to Apr. 20, 1993, has been disclaimed.
Int. Cl.[2] C07D *495/04*
U.S. Cl. 260—243.3 4 Claims

1. The compound 4-Ethyl-10-(4-methyl-1-piperazinyl)-4H-thieno[3,4-b][1,5]benzodiazepine hemifumarate.

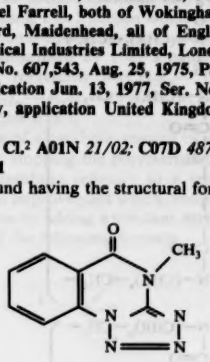
4,087,422

PESTICIDAL DIHYDROTETRAZOLO[1,5-a]QUINAZOLINES

Raymond Alexander Bowie, Macclesfield; John Michael Cox; Gordon Michael Farrell, both of Wokingham, and Margaret Claire Shephard, Maidenhead, all of England, assignors to Imperial Chemical Industries Limited, London, England

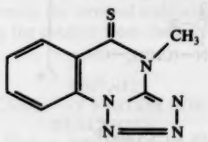
Division of Ser. No. 607,543, Aug. 25, 1975, Pat. No. 4,056,384.
This application Jun. 13, 1977, Ser. No. 806,162
Claims priority, application United Kingdom, Sep. 5, 1974, 38796/74
Int. Cl.[2] A01N *21/02;* C07D *487/04*
U.S. Cl. 544—251 2 Claims

1. The compound having the structural formula:



and chemical name: 4 methyl-4,5-dihydro tetrazol [1,5-a] quinazolin-5-one.

2. The compound having the structural formula:



and chemical name: 4-methyl-4,5-dihydrotetrazolo [1,5-a] quinazolin-5-thione.

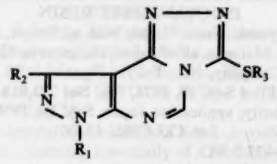
4,087,423

PYRAZOLO[4,3-e][1,2,4]TRIAZOLO[4,3-c]PYRIDINES

Uwe D. Treuner, and Hermann Breuer, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 678,832, Apr. 21, 1976, Pat. No. 4,053,474.
This application Jul. 20, 1977, Ser. No. 817,282
Int. Cl.[2] C07D *487/14*
U.S. Cl. 544—251 8 Claims

1. A compound of the formula



wherein R_1 and R_2 each is hydrogen or lower alkyl;
R_3 is

and
R_5 and R_6 together with the nitrogen form one of the heterocyclic radicals pyrrolidino, piperidino, morpholino or piperazino.

4,087,424

NOVEL PENICILLINS AND CEPHALOSPORINS AND PROCESS FOR PRODUCING THE SAME

Isamu Saikawa; Shuntaro Takano, both of Toyama; Chosaku Yoshida, Takaoka; Okuta Takashima, Toyama; Kaishu Momonoi, Shinminato; Seietsu Kuroda, Toyama; Miwako Komatsu, Fuchumachi; Takashi Yasuda, Kosugimachi, and Yutaka Kodama, Toyama, all of Japan, assignors to Toyama Chemical Co., Ltd., Tokyo, Japan

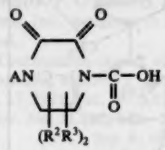
Filed Apr. 24, 1975, Ser. No. 571,479

Claims priority, application Japan, May 9, 1974, 49-50663; May 13, 1974, 49-52254; May 31, 1974, 49-60787; Aug. 13, 1974, 49-91996; Sep. 26, 1974, 49-109954; Mar. 27, 1975, 50-142499

Int. Cl.[2] C07D *241/08*

U.S. Cl. 260—268 C 4 Claims

1. An acid halide, acid azide, acid cyanide, cyanomethyl ester or trichloromethyl ester of a compound of the formula,



wherein

A is a hydrogen atom or a C_{1-12} alkyl, C_{2-4} alkenyl, phenyl, naphthyl, benzyl or phenethyl group any of which may be substituted by a substituent selected from the group consisting of halogen, hydroxyl, nitro, cyano, pyrrolidino, piperidino, acetyloxy and morpholino;

R^2 and R^3 are linked to the same carbon atom; and R^2 and R^3 individually are hydrogen, methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl or octyl.

4,087,425

N,N-DISULFONYLPIPERAZINES

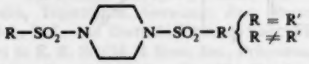
Antonio Alcaide Garcia, Guadalajara; Juan Ramon Conde Ruiz, and Juan Bermejo Lozano, both of Madrid, all of Spain, assignors to Laboratorios Liade, S.A., Madrid, Spain

Filed Aug. 12, 1976, Ser. No. 713,639

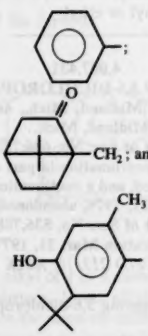
Int. Cl.[2] C07D *295/18*

U.S. Cl. 544—383 9 Claims

1. A piperazine derivative having the general structure



wherein R and R′ are selected from the group consisting of



4,087,426

OXYBISBERBERINE AND A PROCESS FOR ITS PRODUCTION

Maurice Shamma, and Jerome L. Moniot, both of State College, Pa., assignors to Research Corporation, New York, N.Y.

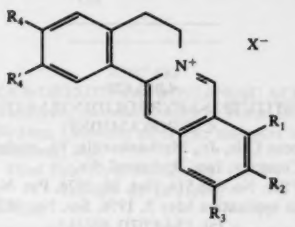
Filed Aug. 16, 1976, Ser. No. 714,531

Int. Cl.[2] C07D *519/00*

U.S. Cl. 260—286 R 7 Claims

1. A process for the oxidative dimerization of a compound selected from the group of berberinium and protoberberinium derivatives, free of oxoberberine or the corresponding oxoprotoberberine derivatives comprising the steps of

(a) reacting a compound having the formula



wherein R_1, R_2, and R_3 are hydrogen, hydroxy, alkanoyloxy, alkoxy, phenylalkanoyloxy, phenylalkoxy, alkoxyalkoxy, cycloalkylalkoxy, alkoxycarbonyloxy, phenylalkoxycarbonyloxy, R_4 and R_4' have the same value as R_1 other than hydrogen and hydroxy, and, when joined together R_4 and R_4' form a member of the group consisting of alkylenedioxy, alkylenedicarbonyloxy, phenylalkylenedicarbonyloxy, diphenylalkylenedicarbonyloxy, phenylalkylenedioxy, diphenylalkylenedioxy, alkoxyalkylenedioxy, cycloalkylalkylenedioxy, alkylenedioxydicarbonyloxy, phenylalkylenedioxydicarbonyloxy, diphenylalkylenedioxydicarbonyloxy, in all of the foregoing groupings the prefix alk . . . signifies a carbon and hydrogen containing moiety of 1 to 5 carbon atoms, provided, however, that cycloalkyl is 3 to 7 carbon atoms, X^- is an anion of an organic or inorganic acid capable of quaternizing the berberinium, or protoberberinium group

with an oxidizing agent having an anion selected from the group consisting of ferric ions and ferricyanide in the presence of an aqueous inorganic hydroxylic base selected from the group consisting of ammonium hydroxide, alkali metal hydroxide, and alkaline earth metal hydroxide;

(b) extracting the product from the reaction mixture with a substantially water immiscible reaction inert polar organic solvent, substantially immediately,

to form a dimer of said compound.

7. Oxybisberine being the dimerization product of the basic oxidation of berberine having the following characteristics M.P. 215°–216° C, molecular weight between 715 and 736,

elemental analysis C, 66.13 ± 0.21; H, 5.15 ± 0.25; N, 3.90 ± 0.10 and residual O;

an infrared spectrum devoid of carbonyl absorption bands,

NMR (pyridine-d_5 at 60 MHz with TMS as internal standard):

δ2.00–3.40 m (8H); 3.47 s (3H); 3.57 s (3H); 3.88 s (3H); 3.93 s (3H); 4.58 m (1H); 5.28 s (1H); 5.60 s (2H); 5.67 m (1H); 5.75 m ABq (2H); 6.27, 6.44, 6.48, 6.58, 6.63, and 6.78: (8H in all) (some overlap of peaks); 7.68 s (1H), Crystallographic characteristic (monoclinic plates from pyridine-ether) space group $P2_1/C$, cell dimensions A = 16.12, B = 11.19, C = 16.91, and β = 118° 05′.

4,087,427
2'-(5'-NITROFURYL)-SUBSTITUTED QUINOLINES AND PROCESS FOR PREPARING SAME

Raphael Ralph George Haber, 42 Kaplansky Street, Givatayim, and Eva Schönberger, 38 Mivza Sinae Street, Ba-Yam, Ramat-Yosef, both of Israel

Filed Jun. 6, 1967, Ser. No. 643,830
Claims priority, application Israel, Jun. 23, 1966, 26022
Int. Cl.[2] C07D *215/60, 215/14*
U.S. Cl. 260—287 AR 11 Claims

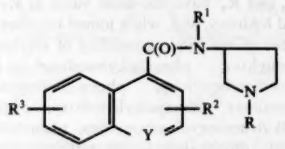
1. A quinoline compound directly linked at one of the 2- and 4- carbons to a 2'-(5'-nitrofuryl) group and substituted at the other of said carbons by a substituent selected from the group consisting of methyl ketone, carboxaldehyde, carboxaldehyde oxime, carboxaldehyde hydrazone, carboxaldehyde semicarbazide, carboxaldehyde amino-oxazolidine, and carboxaldehyde amino-hydantoin; and the N-oxide and non-toxic acid addition salts of such compound.

4,087,428
N-(1-SUBSTITUTED-3-PYRROLIDINYL)-4-QUINOLINE CARBOXAMIDES

Albert Duncan Cale, Jr., Mechanicsville, Va., assignor to A. H. Robins Company, Inc., Richmond, Va.

Division of Ser. No. 536,514, Dec. 26, 1974, Pat. No. 4,002,757. This application May 5, 1976, Ser. No. 683,604
Int. Cl.[2] C07D *401/12*
U.S. Cl. 260—287 F 6 Claims

1. A compound selected from N-(1-substituted-3-pyrrolidinyl)-4-quinolinecarboxamides having the formula:



wherein;

R is lower cycloalkyl having 3 to 9 carbon atoms,

R^1 is selected from the groups consisting of hydrogen, lower-alkyl having 1 to 8 carbon atoms, phenyl or substituted phenyl wherein one to three substituents are selected from halogen or atomic weight less than 80, lower-alkyl having 1 to 8 carbon atoms and lower alkoxy having 1 to 8 carbon atoms,

R^2 is selected from the group consisting of hydrogen, lower-alkyl having 1 to 8 carbon atoms, halogen of atomic weight less than 80, lower-alkoxy having 1 to 8 carbon atoms, amino or nitro,

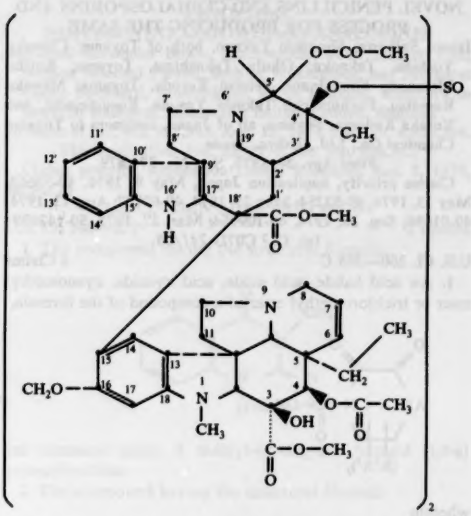
R^3 is selected from the group consisting of hydrogen, lower-alkyl having 1 to 8 carbon atoms, lower-alkoxy having 1 to 8 carbon atoms, halogen atom of atomic weight less than 80, amino or nitro.

4,087,429
5' ACETOXY VINBLASTINE 4' BIS-SULFITE

Allen S. Katner; Gerald E. Gutowski, and Jean C. Miller, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 20, 1976, Ser. No. 734,151
Int. Cl.[2] C07D *519/04*
U.S. Cl. 260—287 B 1 Claim

1. 5'-Acetoxy VLB 4'-bis-sulfite ester of the formula

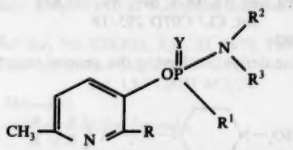


4,087,430
PYRIDYL-PHOSPHONAMIDOTHIOATES, PYRIDYLPHOSPHORODIAMIDOTHIOATES, OXY ANALOGUES THEREOF AND DERIVATIVES THEREOF

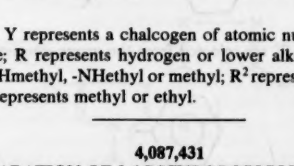
Chester E. Pawloski, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 619,862, Oct. 6, 1975, abandoned, which is a continuation of Ser. No. 468,846, May 10, 1974, abandoned. This application Jan. 10, 1977, Ser. No. 758,217
Int. Cl.[2] C07D *213/02;* A01N *9/22*
U.S. Cl. 260—294.8 K 11 Claims

1. A compound of the formula:



(I)



wherein Y represents a chalcogen of atomic number 8 to 16, inclusive; R represents hydrogen or lower alkoxy; R^1 represents -NHmethyl, -NHethyl or methyl; R^2 represents hydrogen and R^3 represents methyl or ethyl.

4,087,431
PREPARATION OF 3,6-DICHLOROPICOLINIC ACID

Stanley D. McGregor, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 686,753, May 17, 1976, abandoned, which is a continuation-in-part of Ser. No. 536,789, Dec. 27, 1974, abandoned, and a continuation-in-part of Ser. No. 688,641, May 21, 1976, abandoned, which is a continuation-in-part of Ser. No. 536,788, Dec. 27, 1974, abandoned. This application Mar. 21, 1977, Ser. No. 779,859
Int. Cl.[2] C07D *213/16;* A61K *31/455*
U.S. Cl. 260—295 R 7 Claims

1. A process for preparing 3,6-dichloropicolinic acid which comprises:

(a) reacting 3,5,6-trichloro-4-hydrazinopicolinic acid with

from 2 to 3 moles of a basic reagent per mole of the picolinic acid reactant at a temperature of from about 60° C to the reflux temperature for about one-half hour to about three hours; and

(b) acidifying the reaction mixture to a pH of about 1 with a mineral acid and recovering the desired 3,6-dichloropicolinic acid product.

4,087,432

1H-IMIDAZO(4,5-b)PYRIDINE COMPOUNDS

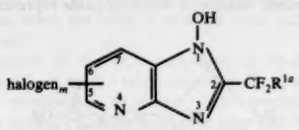
George O. P. O'Doherty, and Kenneth H. Fuhr, both of Greenfield, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 472,923, May 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 181,574, Sep. 17, 1971, Pat. No. 3,813,408, which is a continuation-in-part of Ser. No. 21,535, Mar. 20, 1970, abandoned. This application Sep. 8, 1975, Ser. No. 611,035

Int. Cl.² C07D *471/04*

U.S. Cl. 260—296 H 6 Claims

1. A compound of the formula



wherein R^{1a} represents hydrogen, chlorine, fluorine, difluoromethyl, or trifluoromethyl; and *m* is 2 or 3.

4,087,433

1,5,10,11-TETRAHYDROBENZO[4,5]-CYCLOHEPTA[1,2-b]PYRAZOLO[4,3-e]PYRIDINES

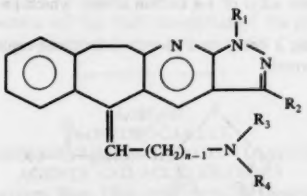
Hans Hoehn, Tegernheim, Germany; Jack Bernstein, New Brunswick, N.J., and Berthold Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 698,992, Jun. 23, 1976, Pat. No. 4,033,970. This application Mar. 28, 1977, Ser. No. 781,619

Int. Cl.² C07D *471/04*

U.S. Cl. 260—296 P 4 Claims

1. a compound of the formula



wherein R_1 is lower alkyl of 1 to 4 carbons, phenyl, benzyl, or phenethyl; R_2 is hydrogen, lower alkyl of 1 to 4 carbons, or phenyl; R_3 and R_4 are the same or different and each is lower alkyl of 1 to 4 carbons; n is an integer from 3 to 6; and a pharmaceutically acceptable acid addition salt thereof.

4,087,434

HETERO-N CONTAINING POLYCYCLIC CHLORINATED HYDROCARBONS RESULTING FROM CYCLO ADDITIONS OF PENTACHLORO-β-PYRROLENINE WITH OLEFINS

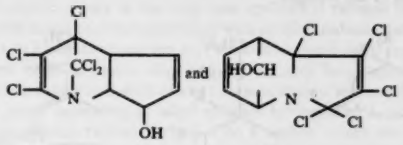
John Lui Wong, Louisville, Ky., assignor to Research Corporation, New York, N.Y.

Filed Sep. 22, 1976, Ser. No. 725,578

Int. Cl.² C07D *221/22*

U.S. Cl. 260—297 T 3 Claims

1. A mixture of compounds of the formulae:



4,087,435

8-AZA-9-DIOXOTHIAPROSTANOIC ACIDS

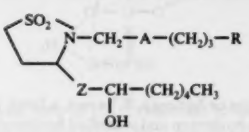
Edward J. Cragoe, Jr., Lansdale; James H. Jones, Blue Bell, and John B. Bicking, Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 17, 1977, Ser. No. 769,477

Int. Cl.² C07D *275/02*

U.S. Cl. 260—301 7 Claims

1. The compound having the following formula:



wherein

R is carboxy, a carboxy salt wherein R is $COO^{\ominus}M^{\oplus}$ wherein M is a pharmaceutically acceptable cation derived from a metal or an amine, or alkoxycarbonyl having the formula $COOR^1$ wherein R^1 is alkyl having 1–10 carbon atoms;

A is ethylene and cis-vinylene; and

Z is ethylene and trans-vinylene.

4,087,436

METHYLATION OF DE-A STEROIDS

Paul Buchschacher, Arlesheim; Andor Fürst, Basel; Ludwig Labler, Allschwil; Werner Meier, Bottmingen, all of Switzerland, and John William Scott, Upper Montclair, N.J., assignors to Hoffmann-La Roche, Inc., Nutley, N.J.

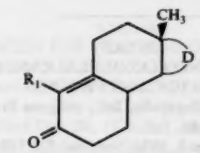
Continuation-in-part of Ser. No. 303,917, Nov. 6, 1972, abandoned. This application Jun. 23, 1975, Ser. No. 589,650

Claims priority, application Switzerland, Nov. 12, 1971, 16516/71

Int. Cl.² C07D *261/06, 317/08;* C07C *49/54, 49/60*

U.S. Cl. 260—307 H 8 Claims

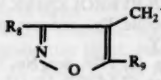
1. In a process wherein a de A-steroid of the formula



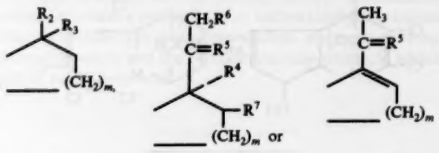
II

wherein R′ is a ketalized 3-oxobutyl; 3-chloro-2-butenyl; 3-methyl-3-butenyl; 3-(lower alkoxy)-2-butenyl; 3-(lower alkoxy)-3-butenyl; 3-hydroxy butyl; 3-esterified-hydroxy-

butyl; 3-etherified-hydroxy-butyl; 2-cyanoethyl; 2-carboxyethyl; 2-(lower alkoxy-carbonyl)-ethyl or of the formula

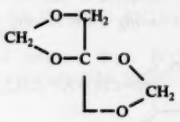


wherein R^8 and R^9 each is hydrogen or identical lower alkyl provided that at least one of R^8 or R^9 is lower alkyl; and D is of the formula



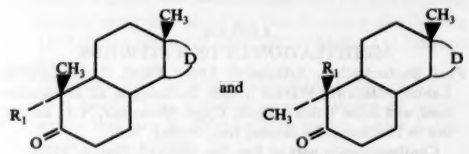
(D_1) (D_2) (D_3)

wherein m is 1 or 2; R^2 is free, esterified or etherfied hydroxy; R^3 is hydrogen, lower alkyl or lower alkynyl; R^2 and R^3 together are a ketal, an ethylidene group, a 1-(lower alkanoyloxy)-ethylidene group or a group of the formula



R^4 is hydrogen or hydroxy, R^5 is oxo, a ketal, (hydrogen and hydroxy), hydrogen and esterified hydroxy) or (hydrogen and etherified hydroxy); R^6 is hydrogen, hydroxy, esterified hydroxy or etherified hydroxy; R^4 and R^6 together are lower alkylenedioxy in the case where R^5 is oxo; and R^7 is hydrogen or methyl,

is treated with a methylation agent in the presence of a base selected from sodium hydride, sodium amide and potassium tert.-butyl alcoholate so as to produce a mixture of compounds of the formula



"10-β" and "10-α"

the improvement which comprises the step of utilizing a methylating agent selected from methyl iodide and methyl bromide and a reaction temperature in the range of from about $-50°$ C. to about $-125°$ C. so as to obtain an isomeric ratio of β to 10α of at least 3.6 to 1.

4,087,437

2-PHENYL-5-BENZOXAZOLYLALKANOIC ACID PURIFICATION PROCESS

Erwin A. Stephan, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Sep. 7, 1976, Ser. No. 720,710
Int. Cl.² C07D *263/56*
U.S. Cl. 260—307 D **8 Claims**

1. A process which comprises reacting dl-2-(4-chlorophenyl)-2-methyl-5-benzoxazolylacetic acid isolated from the acidic hydrolysis of the corresponding nitrile without further purification;

with ammonium hydroxide in an inert solvent to form an ammonium salt;

isolating said ammonium salt, and

then heating the thus-isolated ammonium salt to a temperature in the range of 90°–160° C. thereby decomposing said ammonium salt and providing said dl-2-(4-chlorophenyl)-2-methyl-5-benzoxazolylacetic acid as Form II crystals.

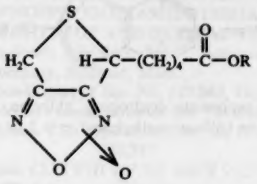
4,087,438

THIENO[3,4-d]FUROXAN AND PROCESS FOR ITS PREPARATION

Michael Marx, Sunnyvale, Calif., and Josef H. Reisdorff, Wuppertal, Germany, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

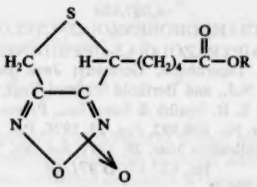
Division of Ser. No. 591,597, Jun. 30, 1975, Pat. No. 4,044,020.
This application Oct. 4, 1976, Ser. No. 729,224
Int. Cl.² C07D *498/04*
U.S. Cl. 260—307 G **4 Claims**

1. An isomeric mixture of thienofuroxans represented by the formula.



wherein R is lower alkyl of 1–4 carbons.

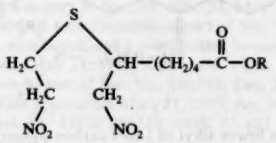
3. A process for preparing an isomeric mixture of thienofuroxans represented by the formula



wherein

R is lower alkyl of 1-4 carbon atoms, which process comprises

contacting a compound chosen from those represented by the formula



with a catalytic amount of tertiary alkyl amine catalyst and phosphorous oxychloride in a suitable solvent under substantially anhydrous conditions.

4,087,439
NEW HIGH MELTING N,N'-TEREPHTHALOYL BIS-PHTHALIMIDE AND ITS USE AS AN ESTER INTERLINKING AGENT FOR POLYESTERS

Yuzi Okuzumi, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 29, 1974, Ser. No. 465,215
Int. Cl.[2] C07D *209/34*
U.S. Cl. 260—326 N 4 Claims

1. A process for preparing N,N'-terephthaloyl bis-phthalimide having a melting point of at least 330° C. consisting of the steps of

(A) reaction of a mixture comprising

(1) terephthaloyl chloride and

(2) an imide selected from the group consisting of phthalimide and alkali metal salts thereof in an ether solvent selected from the group consisting of aromatic and aliphatic-aromatic ethers having boiling points ranging from about 200° C. to about 400° C. and mixtures of at least one of said aromatic or aliphatic-aromatic ethers with an ether selected from the group consisting of cyclic and aliphatic ethers having boiling points ranging from about 65° C. to 150° C.,

at a temperature ranging from 70° C. to 170° C. during the initial stages of said reaction and at a temperature ranging from 200° C. to 400° C. during in final stages of said reaction.

(B) the filtration of the mixture after completion of the reaction, when the imide is an alkali metal salt of phthalimide, and

(C) collection of the N,N'-terephthaloyl bis-phthalimide precipitating from the ether solvent at 60° C and above.

4. As a composition of matter, N,N'-terephthaloyl bis-phthalimide having a melting point of at least 330° C. prepared by

(A) reacting a mixture comprising

(1) terephthaloyl chloride, and

(2) an imide selected from the group consisting of phthalimide and alkali metal salts of phthalimide in an ether solvent selected from the group consisting of

(I) aromatic and aliphatic-aromatic ethers having boiling points ranging from about 200° C. to about 400° C. and

(II) mixtures of at least one of said high boiling aromatic or aliphatic-aromatic ethers with at least one low boiling cyclic or aliphatic ether selected from the group consisting of cyclic ethers and aliphatic ethers having boiling points ranging from about 65° C. to about 150° C.,

at a temperature ranging from 70° C. to 170° C. during the initial stages of said reaction and at a temperature ranging from 200° C. to 400° C. during the final stages of said reaction,

(B) the filtration of the mixture after completion of the reaction, when the imide is an alkali metal salt of phthalimide, and

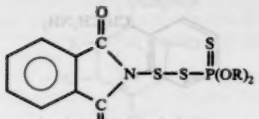
(C) collection of the N,N'-terephthaloyl bis-phthalimide precipitating from the ether solvent at 60° C and above.

4,087,440
N-(HYDROCARBYL THIOPHOSPHORYLDITHIO)-IMIDE VULCANIZATION AGENTS AND ACCELERATORS

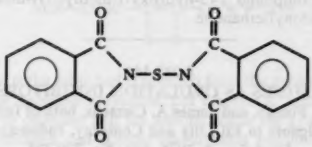
John P. Lawrence, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jun. 18, 1975, Ser. No. 587,933
Int. Cl.[2] C07D *207/48*
U.S. Cl. 260—326 S 3 Claims

1. A process of preparing an imide having the following structural formula



wherein R is selected from the group consisting of alkyl radicals having 1 to 12 carbon atoms, cycloalkyl radicals having 5 to 6 carbon atoms in the ring, said cycloalkyl radicals being unsubstituted or monosubstituted with an alkyl radical containing 1 to 4 carbon atoms and aryl radicals having 6 to 10 carbon atoms in the aromatic ring, said aryl radicals being unsubstituted or substituted with one or two substituents selected from the group consisting of alkyl radicals having 1 to 4 carbon atoms, alkoxy radicals having 1 to 4 carbon atoms and the chloro radical comprising reacting N,N'-thiobis(phthalimide) having the structure



with dithiophosphoric acid having the structure

wherein the molar ratio of the phthalimide to the acid is from 1:1 to 5:1 and the reaction temperature is from 25° C. to 150° C.

4,087,441
PROCESS FOR PREPARING AROMATIC BISIMIDES

Chien Yung Lee, Kendall Park, N.J., assignor to Cities Service Company, Tulsa, Okla.

Filed Jul. 19, 1976, Ser. No. 706,666
Int. Cl.[2] C07D *209/34*
U.S. Cl. 260—326 N 6 Claims

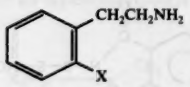
1. A process for preparing an N,N'-alkylene-bis-tetrahalophthalimide which comprises reacting about two molar proportions of a tetrahalophthalic anhydride with about one molar proportion of a diaminoalkane containing 2–6 carbon atoms in an aqueous medium consisting essentially of sufficient water to provide a solids content of about 5–50% by weight, (2) recovering the solid product of the reaction, and (3) drying the product at about 150°–300° C.

4,087,442
PROCESS FOR PRODUCING INDOLINE

Yoshiki Nakayama, Shimizu; Hironobu Sano, Fuji; Sataro Okamura, and Kazunari Hirao, both of Ihara, all of Japan, assignors to Ihara Chemical Industry Co., Ltd., Tokyo, Japan

Filed Oct. 28, 1976, Ser. No. 736,340
Claims priority, application Japan, Aug. 18, 1976, 51-98325
Int. Cl.[2] C07D *209/04*
U.S. Cl. 260—326.11 R 5 Claims

1. A process for producing indoline which comprises cyclization of an o-halogenophenethylamine having the formula



wherein X represents a halogen atom, in the presence of ammonia, and a copper type catalyst which supplies copper ions; and wherein said cyclization is carried out at a temperature below 200° C, under pressure sufficient to retain said ammonia.

4,087,443

2-METHYLSULFONYLACETYL-3-INDOLOL

Richard E. Brown, Hanover, and Paul C. Unangst, Hackettstown, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 611,453, Sep. 8, 1975, Pat. No. 4,028,383. This application Feb. 17, 1977, Ser. No. 769,642

Int. Cl.[2] C07D *209/36*

U.S. Cl. 260—326.12 R **1 Claim**

1. The compound 1-(3-hydroxy-1-methyl-1H-indol-2-yl)-2-(methyl-sulfonyl)ethanone.

4,087,444

AMIDES AS OVULATION INHIBITORS

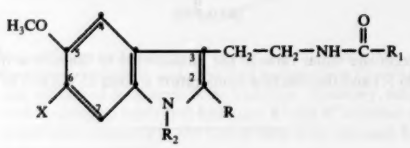
Michael E. Flaugh, and James A. Clemens, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Sep. 8, 1976, Ser. No. 720,311

Int. Cl.[2] C07D *209/18*

U.S. Cl. 260—326.13 B **25 Claims**

1. A compound of the formula



in which

R is hydrogen, C_1–C_4 alkyl, phenyl, or phenyl substituted with halo, C_1–C_4 alkyl, or C_1–C_4 alkoxy;

R_1 is hydrogen or C_1–C_4 alkyl;

R_2 is hydrogen, haloacetyl, C_1–C_5 alkanoyl, benzoyl, or benzoyl substituted with halo or methyl; and

X is halogen.

4,087,445

N-(5,7-DIBROMO-1,3-BENZOXATHIOL-2-YLIDENE)-N-METHYLMETHANAMINIUM BROMIDE, N-(5,7-DIIODO-1,3-BENZOXATHIOL-2-YLIDENE)-N-METHYLMETHANAMINIUM IODIDE AND THEIR PREPARATION

Charles E. Reineke, and Christian T. Goralski, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 686,183, May 13, 1976, abandoned. This application Mar. 24, 1977, Ser. No. 780,889

Int. Cl.[2] C07D *327/04*; A61K *31/40*

U.S. Cl. 260—327 M **8 Claims**

1. A method for making bis-(3,5-dibromo-2-hydroxyphenyl)-disulfide by heating in a reaction vessel having an inert atmosphere at about 170° C to substantial completion of reaction O-(2,4,6-tribromophenyl)-N,N-dimethylthiocarbamate to give N-(5,7-dibromo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium bromide, hydrolyzing the latter by heating it to reflux in methanol containing excess sodium hydroxide for a time sufficient to form bis-(3,5-dibromo-2-hydroxyphenyl)disulfide and recovering the latter from the reaction medium; or making 2,4-diiodo-6-mercaptophenol by heating in a reaction vessel having an inert atmosphere at about 195° C to substantial completion of reaction O-(2,4,6-triiodophenyl)-N,N-dimethylthiocarbamate to give N-(5,7-diiodo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium iodide, hydrolyzing the latter by heating it at reflux in methanol containing excess sodium hydroxide for a time sufficient to form 2,4-diiodo-6-mercaptophenol and recovering the latter from the reaction medium.

4. The method for making N-(5,7-dibromo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium bromide by heating O-(2,4,6-tribromophenyl)-N,N-dimethylthiocarbamate in a reaction vessel under an inert atmosphere at about 170° C to substantial completion of the reaction and recovering N-(5,7-dibromo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium bromide.

5. The method for making N-(5,7-diiodo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium iodide by heating in a reaction vessel under an inert atmosphere at a temperature of about 195° C O-(2,4,6-triiodophenyl)-N,N-dimethylthiocarbamate to substantial completion of reaction and recovering N-(5,7-diiodo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium iodide.

6. A compound of the group consisting of N-(5,7-dibromo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium bromide and N-(5,7-diiodo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium iodide.

4,087,446

PREPARATION OF MALEIC ANHYDRIDE FROM FOUR-CARBON HYDROCARBONS

Noel J. Bremer, Kent; James F. White, Akron, and Ernest C. Milberger, Solon, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 21, 1976, Ser. No. 734,704

Int. Cl.[2] C07D *307/60*

U.S. Cl. 260—346.75 **11 Claims**

1. In the process for the production of maleic anhydride by the oxidation of n-butane, n-butenes, 1,3-butadiene or mixture thereof with molecular oxygen in the vapor phase at a reaction temperature of about 250° to 600° C in the presence of a catalyst, the improvement comprising using as a catalyst a catalyst of the formula

$$X_aMo_3P_bO_x$$

wherein

X is at least one element selected from the group consisting of As, Rb, Pd, Cd, Cs, Tl and In; and wherein

a is a positive number less than about 10;

b is a positive number less than about 3;

x is the number of oxygens required to satisfy the valence states of the other elements present.

4,087,447

ANTI-SECRETORY PROSTAGLANDINS INTERMEDIATES

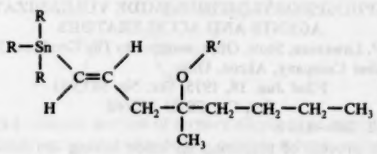
Paul W. Collins, Deerfield, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Feb. 22, 1977, Ser. No. 770,537

Int. Cl.[2] C07F *7/22*

U.S. Cl. 260—429.7 **4 Claims**

1. A compound of the formula:



wherein R is lower alkyl having 1–6 carbon atoms and R' is trialkylsilyl wherein the alkyls have 1–4 carbon atoms.

4,087,448

PROCESS FOR PREPARING EQUILIBRATED ORGANOPOLYSILOXANE MIXTURES WITH ORGANOSULFONIC ACID GROUPS LINKED TO SILICON

Gerd Rossmy, Haltern-Lavesum, and Rolf-Dieter Langenhagen, Hattingen-Niederwenigern, both of Germany, assignors to Th. Goldschmidt AG, Essen, Germany

Filed Apr. 7, 1977, Ser. No. 785,675

Claims priority, application United Kingdom, Apr. 8, 1976, 14391/76

Int. Cl.² C07F *7/08*

U.S. Cl. 260—448.2 E **8 Claims**

1. A process for the preparation of equilibrated organopolysiloxane mixtures with organosulfonic acid groups attached to silicon atoms comprising reacting organopolysiloxanes with organosulfonic acids with the simultaneous removal of water from the reaction mixture.

4,087,449

PROCESS FOR PRODUCING METHANOL

Friedemann Marschner, Weisskirchen; Emil Supp, Dietzenbach, and Günter Pockrandt, Bad Homburg, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 608,300, Aug. 27, 1957, abandoned. This application Mar. 9, 1977, Ser. No. 776,078

Int. Cl.² C07C *29/16*

U.S. Cl. 260—449.5 **1 Claim**

1. A process of producing methanol comprising

(a) gasifying coal by a counterflow treatment with oxygen and water vapor;

(b) cooling the resultant gas;

(c) scrubbing and purifying the resultant gas with cold methanol at a temperature of −40° C;

(d) in a tubular reaction zone synthesizing methanol at a pressure of about 64 bars, a temperature of about 255° C and in the presence of a catalyst containing copper, zinc and vanadium;

(e) withdrawing methanol and residual gas from said tubular reaction zone, dividing said residual gas into a first and a second partial stream at a ratio of about 5:2;

(f) mixing the first partial stream of said residual gas with water vapor and reacting the mixture in contact with a nickel-containing steam reforming catalyst at a pressure of about 10–30 bars and at a temperature of about 700–850° C to produce a gas rich in carbon oxides and hydrogen;

(g) burning the second partial stream of said residual gas for heating the reaction of the first partial stream in step (f), and

(h) cooling the gas rich in carbon oxides and hydrogen from step (f), mixing it with cooled gas from step (b) or scrubbed and purified gas from step (c) and supplying it to the methanol synthesis of step (d).

4,087,450

(POLYCHLOROPHENOXY) METHYL ESTERS OF THIOCYANIC ACID

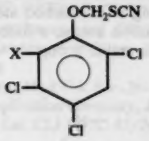
James K. Pierce, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 366,897, Jun. 4, 1973, abandoned. This application Jan. 27, 1977, Ser. No. 762,970

Int. Cl.² C07C *161/02*

U.S. Cl. 260—454 **3 Claims**

1. A compound corresponding to the formula



wherein X represents chloro or hydrogen.

4,087,451

2,3-DIHALO-1,4-DITHIOCYANO-2-BUTENES AND THEIR HOMOLOGS

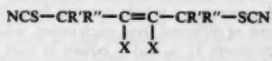
John J. Merianos, Jersey City, N.J., assignor to Kewanee Industries, Inc., Bryn Mawr, Pa.

Filed Apr. 20, 1977, Ser. No. 789,215

Int. Cl.² C07C *161/02*; A01N *9/18*

U.S. Cl. 260—454 **7 Claims**

1. An antimicrobial compound having the structure:



wherein X is the same and is selected from the group consisting of chlorine, bromine and iodine, and wherein R' and R'' may be the same or different and are selected from the group consisting of hydrogen and acyclic monovalent branched and unbranched saturated hydrocarbon radicals having 1 to 8 carbon atoms.

4,087,452

PROCESS OF HYDROCYANATION OF UNSATURATED ORGANIC COMPOUNDS CONTAINING AT LEAST ONE ETHYLENIC DOUBLE BOND

Emile Kuntz, Lyon, France, assignor to Rhone-Poulenc Industries, Paris, France

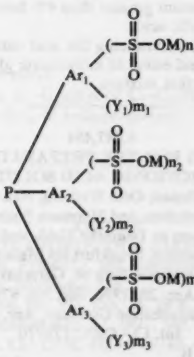
Filed Jan. 10, 1977, Ser. No. 758,149

Claims priority, application France, Jan. 13, 1976, 76 00691

Int. Cl.² C07C *120/02*

U.S. Cl. 260—464 **35 Claims**

1. A process for hydrocyanation of unsaturated organic compounds which contain at least one ethylenic double bond comprising the step of reacting at least one unsaturated organic compound which contains at least one ethylenic double bond with a compound from the group of hydrogen cyanide and a hydrogen cyanide donator compound in the presence of an aqueous solution comprising at least one phosphine of Formula I



wherein Ar_1, Ar_2 and Ar_3 each represent an aryl group which may be alike or different from each other; Y_1, Y_2 and Y_3 which

may be alike or different from each other each represent an alkyl group containing 1 to 4 carbon atoms, an alkoxy group containing 1 to 4 carbon atoms, a halogen, cyano-,nitro- or hydroxy radical or an amino group

wherein R_1 and R_2 which may be alike or different from each other each represent an alkyl group containing 1 to 4 carbon atoms; M represents a cation which is able to form water soluble compounds of Formula I selected from the group consisting of a proton, a cation derived from an alkaline metal or an alkaline earth metal, ammonium, a group $N(R_3R_4R_5R_6)+$ wherein R_3, R_4, R_5 and R_6 each represent hydrogen or an alkyl group containing 1 to 4 carbon atoms and may be alike or different from each other, and a cation of any other metal, which is able to form water soluble salts with benzosulfonic acids; m_1, m_2, and m_3 each represent a whole number from 0 to 5 which may be the same or different from each other and n_1, n_2 and n_3 each represent a whole number from 0 to 3, which may be the same or different from each other, whereby at least one of these numbers n_1, n_2 and n_3 equals at least one and further comprising a compound of a transition metal and a nickel reducing agent when said transition metal compound is a nickel compound having an oxidation value of nickel above zero.

4,087,453

PROCESS FOR OBTAINING GLYCOLS AND GLYCERINE OR DI- AND TRIESTERS THEREOF FROM POLYGLYCOLS AND POLYGLYCERINE

Fred A. Sherrod, Freeport; William L. Howard, and Joanne D. Burger, both of Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 469,138, May 13, 1974, abandoned. This application Jun. 18, 1976, Ser. No. 697,799

Int. Cl.² C07C *29/00, 31/20, 31/22, 67/24*

U.S. Cl. 560—240 **15 Claims**

1. A process for obtaining di-or triesters of monomeric glycols and glycerine respectively from polyoxyalkylene glycols and polyglycerine, respectively, which comprises

(A) heating at a temperature of from about 100° to about 200° C in a reactor for a period of time sufficient to produce the di-or triesters of the monomeric glycol or glycerine, respectively;

(1) one of the polyols together with

(2) acetic, propionic or butyric acid in the presence of

(3) a strong acid, or the acid form of a strong acid cation exchange resin, as catalyst wherein said catalyst is present in an amount greater than 4% based on total polyol and carboxylic acid

(B) separating or neutralizing the acid catalyst; and

(C) separating said esters of monomeric glycol or glycerine from said reaction mixture.

4,087,454

PROCESS FOR THE PREPARATION OF PERPROPIONIC ACID SOLUTIONS

Gunter Prescher, Hanau; Otto Weiberg, Neu-Isenburg; Helmut Waldmann, Leverkusen, and Hermann Seifert, Cologne, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt am Main and Bayer Aktiengesellschaft, Leverkusen, both of, Germany

Filed Apr. 28, 1976, Ser. No. 678,821

Claims priority, application Germany, Apr. 30, 1975, 2519299

Int. Cl.² C07C *179/10*

U.S. Cl. 260—502 R **6 Claims**

1. In the process of producing perpropionic acid by reaction of hydrogen peroxide and propionic acid in an aqueous medium and in the presence of sulfuric acid catalyst for the reaction, the improvement which comprises, for the reduction of explosion hazard in the reaction mixture: employing an initial molar ratio of hydrogen peroxide: propionic acid of 0.8 to less than 1.4:1; a temperature of 20°–60° C; a weight ratio of hydrogen peroxide: water before the start of the reaction thereof with propionic acid, based on 100% hydrogen peroxide, of up to 1.2, the concentration of the sulfuric acid in the reaction mixture being 10–40% by weight.

4,087,455

PROCESS FOR THE CONTINUOUS PREPARATION OF PERCARBOXYLIC ACIDS IN ORGANIC SOLUTIONS

Günter Prescher; Gerd Schreyer, both of Hanau; Helmut Waldmann, and Wulf Schwerdtel, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen and Deutsche Gold-und Silber-Scheideanstalt Vormal Roessler, Frankfurt am Main, both of, Germany

Filed Apr. 28, 1976, Ser. No. 678,824

Claims priority, application Germany, Apr. 30, 1975, 2519295

Int. Cl.² C07C *179/10*

U.S. Cl. 260—502 R **28 Claims**

1. In the process for the continuous production of an organic solution of percarboxylic acid which comprises contacting aqueous hydrogen peroxide with the corresponding carboxylic acid for the reaction of the hydrogen peroxide and carboxylic acid to form the percarboxylic acid and water in an reaction mixture, in the presence of an acid, water soluble catalyst for the reaction, extracting the reaction mixture with organic solvent selected from the group consisting of aliphatic, cycloaliphatic and aromatic hydrocarbons, chlorinated hydrocarbons, esters of carboxylic acids and ethers to form a solvent phase rich in the carboxylic acid and an aqueous raffinate phase rich in hydrogen peroxide and catalyst, distilling the raffinate to remove water therefrom and form a concentrated aqueous, hydrogen peroxide, acid solution and recycling the concentrated solution, said contacting, wherein aqueous make-up hydrogen peroxide and make-up carboxylic acid are introduced into said contacting to replace hydrogen peroxide and carboxylic acid consumed in the reaction, the improvement which comprises introducing at least part of the make-up aqueous hydrogen peroxide into said distillation for distillation thereof together with distillation of the raffinate, the amount of water removed in the distillation being about equal to the sum of the water formed in the reaction and the water introduced into the process, said distillation being performed at 10–250 mm Hg. and 40°–120° C to provide the distilled water as overhead and said concentrated solutions as sump product, and recycling the sump product to said contacting.

4,087,456

PURIFICATION OF OLEOPHILIC HYDROCARBON SULFONATE PRODUCT MIXTURES

Paul S. Ossip, Denver, and Larry M. Echelberger, Littleton, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Oct. 27, 1972, Ser. No. 301,572

Int. Cl.² C07C *143/24*

U.S. Cl. 260—505 P **5 Claims**

1. In a process for the production of hydrocarbon sulfonates by reaction of sulfur trioxide with aromatic hydrocarbons at temperatures in the range of from about 0 to about 100° C., followed by neutralization with an inorganic hydroxide, to form a product mixture comprising oleophilic hydrocarbon sulfonates, undesired hydrophilic hydrocarbon sulfonates, and undesired inorganic sulfites and inorganic sulfates, the improvement comprising in combination the steps of:

(a) adding to said product mixture after neutralization from about 0.05 to about 10.0 moles of a neutral oleophilic organic compound and from 5 to about 500 moles of water, both per mole of sulfonate groups in said product mixtures,

(b) allowing separation to provide a lower phase containing

substantial amounts of said undesired inorganic sulfates, inorganic sulfites, and hydrophilic hydrocarbon sulfonates and water, and an upper phase comprising substantial amounts of said desired oleophilic hydrocarbon sulfonates, together with substantial amounts of neutral oleophilic organic compound, and thereafter, recovering at least a portion of said upper phase.

4,087,457

AIR INITIATION FOR DETERGENT RANGE PENDANT OR INTERNAL OLEFIN SULFITATION

Ronald J. Convers, and Le Roy Rose, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Nov. 22, 1976, Ser. No. 743,811
Int. Cl.[2] C07C *139/12*
U.S. Cl. 260—513 B **8 Claims**

1. A method for the air initiated sulfitation of pendant and internal olefins containing from 12 to 22 carbon atoms comprising carrying out the reaction in the presence of:

(a) bisulfite to olefin mole ratios of from 1:1 to 3:1 in an alcohol/water system, wherein said alcohol is 1-propanol, 1-butanol, or both 1-propanol and 1-butanol, and said bisulfite is obtained from compounds yielding water-soluble bisulfite ions and counter-ions which are inert with respect to the reaction and selected from the group consisting of sodium bisulfite, ammonium bisulfite, potassium bisulfite, and lithium bisulfite;

(b) sulfite to olefin mole ratios of from 1:1 to 2:1 in said alcohol/water system, said sulfite being obtained from compounds which provide water soluble sulfite ions and counter-ions which are inert with respect to the reaction and selected from the group consisting of sodium sulfite, potassium sulfite and lithium sulfite;

(c) bisulfite concentrations of about 2 to about 4 molar in the water used;

(d) sulfite concentrations of from about 1 to about 2.5 molar in the water used;

(e) olefin concentrations of .8 to 2.5 molar in the alcohol used;

(f) an alcohol/water volume ratio of 1:3 to 3:1;

(g) reaction temperatures of 0° to about 100° C;

(h) sufficient pressure to prevent reflux of the reaction mixture;

(i) sufficient agitation to produce an emulsion of said reaction mixture;

(j) under an oxygen flow rate of about 0.1 to about 2.0 moles percent per hour based upon the starting olefins.

4,087,458

PROCESS FOR PREPARATION OF 2-(AMYLBENZOYL)BENZOIC ACID

Fumitoshi Emori, Gojoh; Yasuhisa Iwasaki, Ikoma, and Takao Yoshimura, Nara, all of Japan, assignors to Yamamoto Kagaku Gosei Co., Ltd., Yao, Japan

Filed May 6, 1977, Ser. No. 794,620
Claims priority, application Japan, May 10, 1976, 51-53676; May 19, 1976, 51-58042
Int. Cl.[2] C07C *65/20*
U.S. Cl. 260—517 **8 Claims**

1. A process for preparation of 2-(amylbenzoyl)benzoic acid containing 2-(t-amylbenzoyl)benzoic acid in a higher percentage than that of 2-(s-amylbenzoyl)benzoic acid, wherein said 2-(amylbenzoyl)benzoic acid is prepared by reacting t-amylbenzene with phthalic anhydride in the presence of Lewis acid, which process is characterized by that the isomerization reaction is suppressed by applying one of the means selected from the group consisting of the means of introducing an inert gas into the reaction system and the means of reducing the pressure of the reaction system.

4,087,459

PROCESS FOR THE PREPARATION OF POLYAMINES

Hartmut Knöfel, Leverkusen, and Günther Ellendt, Krefeld, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jun. 16, 1976, Ser. No. 696,662
Claims priority, application Germany, Jun. 27, 1975, 2528694
Int. Cl.[2] C07C *85/24*
U.S. Cl. 260—570 D **15 Claims**

1. In a process for the preparation of multinuclear aromatic polyamines by the condensation of aniline with formaldehyde in the presence of water and acid catalysts, in which the completely reacted aqueous condensation mixture is extracted with a hydrophobic solvent in extraction stage (I), optionally with the addition of aniline, the resulting solvent phase is worked-up in known manner to isolate the polyamine and the aqueous phase is recycled to the beginning of the process, the improvement characterised in that before the aqueous phase is returned to the beginning of the process, it is extracted in one or more separate extractors (II) with a hydrophobic solvent which may contain aniline and/or aniline/formaldehyde condensates with an increased proportion of ortho-isomers, the resulting solvent phase or phases is or are extracted with the aqueous acid condensation mixture in one or more separate extractors (III) at any one or more points after the first condensation stage and before the main extraction stage (I), and the resulting solvent phase or phases is or are returned to extractor or extractors (II).

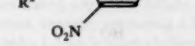
4,087,460

SUBSTITUTED N-ALKOXY-N-SUBSTITUTED-2,6-DINITROANILINES AND INTERMEDIATES FOR THE PREPARATION THEREOF

Herschel D. Porter, and James C. Williams, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jun. 27, 1977, Ser. No. 810,229
Int. Cl.[2] C07C *93/00*; A01N *9/20*
U.S. Cl. 260—574 **12 Claims**

1. A compound of the formula



wherein

R^1 is methyl or ethyl;

R^2 is hydrogen, C_1–C_3 alkyl or C_3–C_4 alkenyl; and

R^3 is methyl, ethyl, or trifluoromethyl.

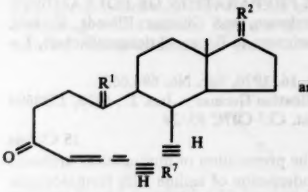
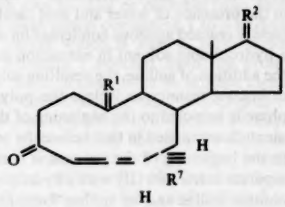
4,087,461

ANTI-ANDROGENIC STEROIDS

Cecil H. Robinson, Pylesville, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Division of Ser. No. 661,792, Feb. 26, 1976, Pat. No. 4,059,630. This application Aug. 22, 1977, Ser. No. 826,750
Int. Cl.[2] C07C *49/44, 49/46, 49/54*
U.S. Cl. 260—586 E **5 Claims**

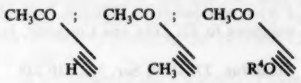
1. An allenic steroid selected from the group of formulas consisting of:


and


wherein R^1 is $CH_2=$, O= or

R^2 is O=,

(where R^3 is H or lower alkanoyl);



(where R^4 is H or lower alkanoyl);

(where R^5 is lower alkyl) or

(where R^6 is H, lower alkyl or Cl); and R^7 is H or CH_3.

4,087,462

PRODUCTION OF FORMALDEHYDE IN A FLUIDIZED BED WITH A FIXED TEMPERATURE GRADIENT

Walter Neugebauer, Schlangenbad-Georgenborn, and Heinz Friedrich, Grossauheim, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler, Frankfurt, Germany

Filed Jan. 31, 1974, Ser. No. 438,462
Claims priority, application Germany, Feb. 1, 1973, 2304762
Int. Cl.² C07C *45/16*
U.S. Cl. 260—603 C **6 Claims**

1. In a process for the production of formaldehyde by the gas phase reaction of methanol with oxygen in a fluidized bed of a solid oxide catalyst the improvement comprising carrying out said reaction with a negative temperature gradient through the fluidized bed of from 0.1° to 2.0° C./cm. of fluidized bed height in the bed in the direction of gas flow.

4,087,463

HYDROGENOLYSIS OF HYDROBENZOINS

Denis Forster, and George F. Schaefer, both of St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 22, 1976, Ser. No. 753,042
Int. Cl.² C07C *41/00, 1/22*
U.S. Cl. 260—613 A **30 Claims**

1. A process for the hydrogenolysis of hydrobenzoins which comprises

(a) contacting the hydrobenzoin in an inert solvent system at hydrogenolysis conditions with a gaseous mixture of hydrogen and carbon monoxide and a homogeneous catalyst comprising cobalt carbonyl for a time sufficient to cause hydrogenolysis of the hydrobenzoin 1,2-diol functionality carbon-oxygen bonds wherein the oxygen so cleaved from each carbon atom is replaced by a hydrogen atom, and thereafter

(b) recovering the product of such hydrogenolysis.

4,087,464

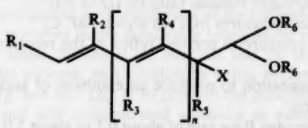
α-HALOGENO-ACETALS OF ETHYLENICALLY UNSATURATED ALDEHYDES AND THEIR PREPARATION

Jean-Pierre Décor, Thurins, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed Feb. 23, 1977, Ser. No. 771,304
Claims priority, application France, Feb. 25, 1976, 76 05243
Int. Cl.² C07C *43/30, 41/00*
U.S. Cl. 260—615 A **10 Claims**

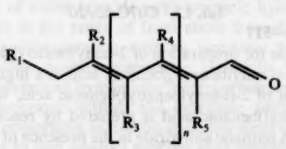
1. An α-halogeno-acetal of an ethylenically unsaturated aldehyde corresponding to the formula:

(I)



in which: R_1, R_2, R_3, R_4 and R_5, which may be identical or different, represent hydrogen or straight or branched alkyl of from 1 to 6 carbon atoms, X represents chlorine or bromine, R_6 represents straight or branched alkyl of from 1 to 6 carbon atoms, and *n* represents zero or 1.

6. Process for the preparation of an α-halogeno-acetal of an ethylenically unsaturated aldehyde as claimed in claim 1, which comprises reacting a hypochlorite or hypobromite of a saturated aliphatic tertiary alcohol with an ethylenically unsaturated aldehyde of the formula:



in which R_1, R_2, R_3, R_4 and R_5 are as defined in claim 1, at a temperature between −40° and +80° C in the presence of a saturated aliphatic primary alcohol of the formula R_6OH, in which R_6 is as defined in claim 1.

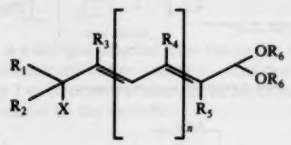
4,087,465

PROCESS FOR THE PREPARATION OF HALOGENO-ACETALS FROM ENOXYSILANES

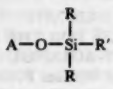
Jean-Pierre Decor, Thurins, France, assignor to Rhone-Poulenc Industries, Paris, France

Filed Feb. 23, 1977, Ser. No. 771,313
Claims priority, application France, Feb. 25, 1976, 76 05242; Jan. 13, 1977, 77 00855
Int. Cl.[2] C07C *41/00*
U.S. Cl. 260—615 A 11 Claims

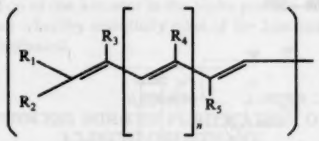
1. Process for the preparation of a halogeno-acetal of an ethylenically unsaturated aldehyde of the formula:



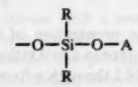
in which: X represents chlorine, bromine or iodine, R_1, R_2, R_3, R_4 and R_5, which may be identical or different, represent hydrogen, straight or branched alkyl of 1 to 6 carbon atoms, or straight or branched alkenyl of 3 to 6 carbon atoms in which the double bond is in a position other than the 1–2 position, n is 0, 1, 2, 3 or 4, it being understood that if n is greater than 1, the various symbols R_4 may be identical or different, and the two symbols R_6 each represent straight or branched alkyl of 1 to 6 carbon atoms, or they together form a straight or branched alkylene radical R'_6 of 2 to 6 carbon atoms, optionally substituted by hydroxyl or alkoxy of 1 to 4 carbon atoms, which comprises reacting a halogen cation chosen from Cl^+, Br^+ and I^+ with an enoxysilane of the formula:



in which A represents a radical of the formula:



in which R_1, R_2, R_3, R_4, R_5 and n are defined as above, R represents straight or branched alkyl of 1 to 12 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenyl, alkylphenyl of which the alkyl contains 1 to 6 carbon atoms, or phenylalkyl of which the alkyl contains 1 to 6 carbon atoms, and R' is identical to R or represents a radical of the general formula:



in which R and A are as defined above, in the proportion of one halogen cation per mol of the enoxysilane at a temperature of −40° to +80° C and in the presence of an excess of a primary or secondary alcohol of the formula R_6OH in which R_6 is as defined above, or of a glycol of the formula HO—R'_6—OH in which R'_6 is as defined above.

4,087,466

POLYCONDENSATION OF GLYCIDOL ON ALPHA DIOLS WITH FATTY CHAIN WITH ALKALINE CATALYSTS, PRODUCTS THUS OBTAINED AND UTILIZATION

Guy Vanlerberghe, Montjay-la-Tour, and Henri Sebag, Paris, both of France, assignors to L'Oreal, Paris, France

Division of Ser. No. 561,630, Mar. 24, 1975, Pat. No. 3,966,398, which is a division of Ser. No. 384,635, Aug. 1, 1973, Pat. No. 3,928,224, which is a continuation-in-part of Ser. No. 142,409, May 11, 1971, Pat. No. 3,821,372. This application Apr. 19, 1976, Ser. No. 678,030
Claims priority, application Luxembourg, May 12, 1970, 60900
Int. Cl.[2] C07C *43/10, 41/02*
U.S. Cl. 260—615 B 4 Claims

1. A mixture of compounds having the formula

$$R—CHOH—CH_2—O\left[CH_2—CHOH—CH_2—O\right]_nH$$

wherein R is a mixture of alkyl radicals having 9–2 carbon atoms and n has a mean statistical average value of 3.5.

4,087,467

8-EXO-HYDROXYMETHYL-ENDO-TRICYCLO [5.2.1.$0^{2,6}$]DECANE

Yoshiaki Inamoto; Yoshiaki Fujikura, and Hiroshi Ikeda, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Nov. 26, 1976, Ser. No. 744,956
Claims priority, application Japan, Dec. 4, 1975, 50-144674
Int. Cl.[2] C07C *35/22, 29/14*
U.S. Cl. 568—817 1 Claim

1. 8-exo-hydroxymethyl-endo-tricyclo [5.2.1.$0^{2,6}$] decane.

4,087,468

PREPARATION OF GRIGNARD REAGENTS OF HALODIENES AND PREPARATION OF DIENOLS

Paul W. Solomon, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 12, 1975, Ser. No. 640,296
Int. Cl.[2] C07C *29/00;* C07F *3/02;* C07C *29/00;* C07F *3/02*
U.S. Cl. 568—807 38 Claims

1. A process for preparing a mixture of conjugated and allenic dienols which comprises the steps of:

(1) adding (a) a solution of a 1- or 2-halo-1,3-hydrocarbyl diene in a diluent comprising an ether optionally with a hydrocarbon to (b) an ether dispersion of an effective amount and effective ratios of magnesium metal, a metal halide, and a saturated aliphatic halide promoter, under reaction conditions, thereby preparing a Grignard reagent of said 1- or 2-halo-1,3-hydrocarbyl diene,

(2) contacting said Grignard reagent with an effective amount of a carbonyl compound which is an aldehyde or ketone, under reaction conditions, and

(3) hydrolyzing the carbonyl-treated Grignard reagent from said step (2), thereby preparing said mixture of dienols,

wherein when said ratio of said metal halide:said halo-1,3-hydrocarbyl diene is at least about 0.2:1 said mixture of dienols predominates in said conjugated dienol, and when said ratio of said metal halide:said halo-1,3-hydrocarbyl diene is less than about 0.2:1, said mixture of dienols predominates in said allenic dienol,

wherein said ether in said diluent is selected from the group consisting of tetrahydrofuran, 1,4-dioxane, dimethyl ether of ethylene glycol, dimethyl ether of diethylene glycol, diethyl ether of ethylene glycol, diethyl ether of diethylene glycol, alone, or in admixture, and

wherein said metal salt is the chloride, bromide, or iodide of zinc, cadmium, mercury, or indium,

said saturated aliphatic halide promoter is a saturated aliphatic chloride, bromide, or iodide, and wherein when

said aliphatic halide promoter is said chloride, further employing iodine as a copromoter, and optionally otherwise,

and wherein said 1-halo or 2-halo-1,3-hydrocarbyl diene is represented by the formula:

$$CH_2{=}C(X){-}CH{=}CH{-}R \quad \text{or} \quad CH{=}CH{-}CH{=}CH{-}R$$

wherein X is chlorine, bromine, iodine, and R is hydrogen or an alkyl radical of 1 to 4 carbon atoms per molecule.

4,087,469

METHOD OF PRODUCING 2,2'-METHYLENEBIS(4,6-DIALKYLPHENOLS)

Yakov Abramovich Gurvich, Sretensky bulvar, 6, kv. 61; Alexandr Afroimovich Grinberg, Khalturinskaya ulitsa, 10, korpus 2, kv. 30, both of Moscow; Alexandr Grigorievich Liakumovich, ulitsa Galeeva, 10, kv. 8, Kazan; Jury Ivanovich Michurov, prospekt Lenina, 13, kv. 4, Sterlitamak Bashkirskoi ASSR; Olga Fedorovna Starikova, Rublevskoe shosse, 89, korpus 2, kv. 52, Moscow; Vladimir Avgustovich Yanshevsky, ulitsa Kommunisticheskaya, 42, kv. 12, Novokuibyshevsk; Simona Tevievna Kumok, Poklonnaya ulitsa, 4, kv. 32, Moscow; Evgeny Lvovich Styskin, Khalturinskaya ulitsa, 10, korpus 2, kv. 48, Moscow, and Grigory Iosifich Rutman, ulitsa Revoljutsionnaya, 7, kv. 6, Sterlitamak Bashkirskoi ASSR, all of U.S.S.R.

Filed Dec. 16, 1975, Ser. No. 641,595
Int. Cl.[2] C07C *37/00, 37/20*
U.S. Cl. 568—723 **2 Claims**

1. A process for the preparation of 2,2-methylenebis(4,6-dialkylphenols) which process consists essentially of reacting 2,4-dialkylphenol with an acetal selected from the group consisting of dimethylformal, diethylformal, dimethylacetal, diethylacetal and diisopropylacetal in the presence of an acid catalyst at a temperature of from 30° to 140° C. at a mole ratio of 1 mole of 2,4-dialkylphenol per 1–10 moles of acetal and separating the desired product from said mixture.

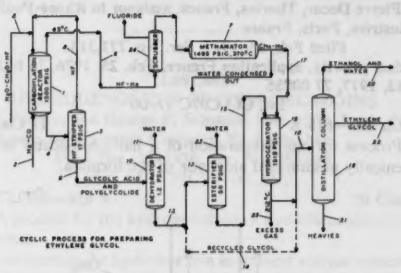
4,087,470

PROCESS FOR THE PRODUCTION OF ETHYLENE GLYCOL

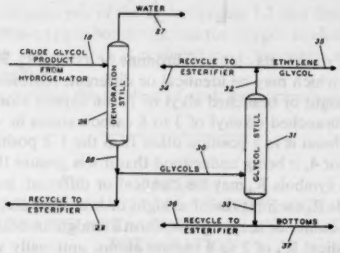
Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jun. 23, 1976, Ser. No. 699,099
The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.
Int. Cl.[2] C07C *31/18*
U.S. Cl. 568—864 **8 Claims**

1. A process for producing ethylene glycol which comprises the steps of: (1) contacting formaldehyde with a synthesis gas comprising carbon monoxide and hydrogen in the presence of hydrogen fluoride under conditions effective to deplete carbon monoxide from the synthesis gas and produce glycolic acid and diglycolic acid; (2) contacting the acid product of step (1) with ethylene glycol, diethylene glycol or mixtures thereof under conditions effective to produce ethylene glycol glycolates, diethylene glycol glycolates or mixtures thereof; (3) removing residual carbon monoxide and hydrogen fluoride from the carbon monoxide depleted synthesis gas of step (1) to produce a hydrogen-rich gas stream; (4) contacting the glycolate product of step (2) with the hydrogen-rich gas stream of step (3) under conditions effective to produce ethylene glycol or diethylene glycol; and (5) recycling sufficient glycol product from



CRUDE PRODUCT DISTILLATION AND RECYCLE



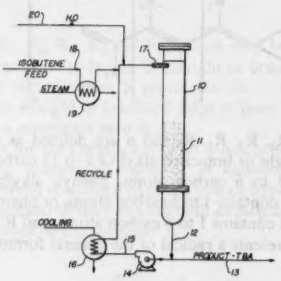
the product of step (4) to the esterification zone of step (2) so as to maintain a molar excess of glycol during esterification.

4,087,471

FIXED BED PROCESS FOR THE PRODUCTION OF T-BUTANOL

William G. Bowman, and William P. Stadig, both of Houston, Tex., assignors to Petro-Tex Chemical Corporation, Houston, Tex.

Filed May 20, 1977, Ser. No. 799,103
Int. Cl.[2] C07C *29/04*
U.S. Cl. 568—899 **18 Claims**



1. A process for the preparation of t-butanol comprising passing water and isobutene in a mol ratio of water:isobutene in the range of 0.06 to 0.24:1 through a fixed bed of acidic cation exchange resin catalyst in liquid phase at a temperature in the range of 65° to 150° C for a sufficient time to react water and isobutene, producing only a hydrocarbon phase, recovering said hydrocarbon phase, containing t-butanol, splitting said hydrocarbon phase, cooling one portion thereof to a temperature in the range of 15° to 110° C and recycling the cooled portion to the reaction.

4,087,472

ISOMERIZATION PROCESS

William B. Hughes, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 16, 1976, Ser. No. 714,932
Int. Cl.[2] C07C 29/00
U.S. Cl. 568—906 9 Claims

1. A process for isomerizing an isomerizable olefinic alcohol having from 4 to 20 carbon atoms per molecule and at least one ethylenic bond which comprises contacting said olefinic alcohol in the liquid phase under isomerization conditions with a catalyst consisting essentially of a mixture of a nickel complex represented by the formula

$$(R_3P)_2NiX_2$$

wherein X is a halogen selected from the group consisting of chlorine, bromine and iodine, and R is a hydrocarbon radical having from 1 to 10 carbon atoms, and an alkali metal borohydride represented by the formula

$$MBH_3Z$$

wherein M is an alkali metal selected from the group consisting of lithium, sodium and potassium, and Z is —H or —CN.

4,087,473

PREFERENTIAL ALIPHATIC HALOGENATION OF AR-SUBSTITUTED ALKYLBENZENES

Lowell D. Markley, Clayton, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 3, 1976, Ser. No. 738,401
Int. Cl.[2] C07C 25/14
U.S. Cl. 260—651 R 9 Claims

9. A process for preferential, aliphatic bromination or iodination of a 3-substituted-1-(sec-alkyl)benzene in an isomeric mixture of (1) a 3-substituted-1-(sec-alkyl)benzene isomer having a substituent in at least the 3-ring position and optionally having substituents in the 4- and 5-ring positions and (2) a 2-substituted-1-(sec-alkyl)benzene isomer having a substituent in at least the 2-ring position and optionally having substituents in the 3- and 4-ring positions, said process comprising the step of contacting the mixture with a suitable brominating or iodinating agent in the presence of an amount of a free radical generator and under conditions sufficient to cause bromination or iodination of the 3-isomer in the alpha position of the 1-sec-alkyl group whereby essentially none of the 2-isomer is brominated or iodinated.

4,087,474

PROCESS FOR THE PURIFICATION OF 1,2-DICHLOROETHANE

Ronald J. Convers, Ponca City, Okla.; Paul L. Fetzer; Homer L. Hackett, both of Lake Charles, La., and Charles M. Starks, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Jun. 6, 1977, Ser. No. 804,113
Int. Cl.[2] C07C 17/38
U.S. Cl. 260—652 P 3 Claims

1. A method for purifying an ethylene oxychlorination product stream comprising;

(1) extracting said stream with a neutral or acidic aqueous solution to obtain a washed 1,2-dichloroethane stream, and an aqueous extract comprising 2-chloroethanol;

(2) adjusting the pH of said aqueous extract to at least 10 and adjusting the temperature to a range of from about 25° to about 100° C to convert 2-chloroethanol to ethylene oxide and ethyleneglycol;

(3) stripping the basic solution of (2) to obtain an aqueous phase, said aqueous phase being discarded, and a distillate comprising ethylene oxide, ethylene dichloride and chloroform;

(4) condensing and hydrolyzing the distillate to convert ethylene oxide to ethylene glycol; and

(5) stripping the hydrolysate to obtain an aqueous solution of ethylene glycol which is discarded, and an overhead comprising ethylene dichloride and chloroform, which overhead is combined with the washed 1,2-dichloroethane stream.

4,087,475

CARBONYL FLUORINATION PROCESS

Robert Kenneth Jordan, 3979 Tuxey Ave., Pittsburgh, Pa. 15227

Filed Jul. 3, 1975, Ser. No. 592,760
Int. Cl.[2] C07C 19/08, 21/18
U.S. Cl. 260—653 1 Claim

1. A process for the production of substituted difluoromethylene compounds comprising combining a carbonyl selected from carbon monoxide, carbonyl halides, aldehydes and ketones with at least one of metal fluorosulfonates, metal fluoride fluorosulfonates, metal fluorosulfinites and metal fluoride fluorosulfinites at a temperature in the range of about −50° C to 500° C.

4,087,476

DEHYDROGENATION METHOD

John C. Hayes, Des Plaines, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 650,574, Jan. 19, 1976, Pat. No. 4,051,071, which is a continuation-in-part of Ser. No. 518,700, Oct. 29, 1974, Pat. No. 3,939,060, which is a continuation-in-part of Ser. No. 288,864, Sep. 13, 1972, Pat. No. 3,846,282. This application May 11, 1977, Ser. No. 795,672
Int. Cl.[2] C07C 5/40
U.S. Cl. 260—668 D 26 Claims

1. A method for dehydrogenating a dehydrogenatable hydrocarbon comprising contacting the hydrocarbon, at dehydrogenation conditions, with a sulfided catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % iridium, about 0.01 to about 5 wt. % nickel and about 0.01 to about 1 wt. % sulfur; wherein the platinum or palladium, iridium, and nickel are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium, iridium and nickel are present in the elemental metallic state or in a sulfided state; and wherein the composite is sulfided, prior to contact with the dehydrogenatable hydrocarbon and after substantially all of the platinum or palladium, iridium and nickel contained therein have been reduced to the corresponding elemental metallic state, by treatment with a sulfiding gas at conditions selected to incorporate about 0.01 to about 1 wt. % sulfur.

4,087,477

METHOD OF REDUCING THE α-ACETYLENE CONTENT OF HYDROCARBON

James J. Tazuma, Stow, and Angelo Bergomi, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 29, 1976, Ser. No. 745,890
Int. Cl.[2] C07C 7/00
U.S. Cl. 260—681.5 R 8 Claims

1. A method of reducing the α-acetylene content of a hydrocarbon fraction which comprises a diolefin containing 4 to 8 carbon atoms and α-acetylenic impurities by contacting said hydrocarbon fraction with a base modified catalyst comprising an inert support treated with an alkali metal hydroxide, connecting the α-acetylenes to their higher boiling isomers and separating said isomers from the isoprene by fractional distillation.

4,087,478

SILOXANE COPOLYMERS AND THREAD FINISHER PREPARED THEREWITH

Joseph W. Keil, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Apr. 14, 1976, Ser. No. 676,825
Int. Cl.[2] C08L *43/04*
U.S. Cl. 260—825 20 Claims

1. A composition which consists essentially of

(I) 2.5 to 10 percent by weight of a copolymeric reaction product of

(A) 60 to 95 percent by weight of a resin consisting essentially of 45 to 72 mole percent SiO_2 units and 28 to 55 mole percent $(CH_3)_3SiO_{1/2}$ units, and

(B) 5 to 40 percent by weight of a resin consisting essentially of 60 of 100 mole percent $RSiO_{3/2}$ units, 0 to 35 mole percent R_2SiO units and 0 to 5 mole percent $R_3SiO_{1/2}$ units, each R radical being independently selected from the group consisting of the methyl, propyl and phenyl radicals, and

(II) 90 to 97.5 percent by weight of a trimethylsilyl endblocked polydimethylsiloxane fluid.

4,087,479

HEAT-CURABLE RESIN COMPOSITIONS FOR POWDER PAINTS

Yoshiho Toyota; Singo Sasaki; Katsuyoshi Atsumi, and Akio Nakagi, all of Okazaki, Japan, assignors to Nippon Ester Co., Ltd., Okazaki, Japan

Filed Aug. 27, 1976, Ser. No. 718,275
Claims priority, application Japan, Aug. 27, 1975, 50-103838
Int. Cl.[2] C08L *63/00*
U.S. Cl. 260—835 22 Claims

1. A heat-curable resin composition having a softening point of about 40° to about 150° C for powder paint which is obtained by mixing (A) a polyester having an average degree of polymerization of about 3 to about 50, a softening point of about 40° C to about 150° C, and a carboxyl group content of 250 gram equivalents/10^6g to about 3,500 gram equivalents/10^6g, obtained by depolymerizing a polyester comprising an aromatic dicarboxylic acid and an aliphatic dialcohol and having a high degree of polymerization represented by an intrinsic viscosity, measured in a mixed solvent of phenol and tetrachloroethane in a 1:1 weight ratio at 20° C, of about 0.4 to about 2.0, using an aromatic or saturated aliphatic polycarboxylic acid having 2 to 4 carboxyl group or an alkyl ester thereof containing 2 to 12 carboxyl groups in the molecule at a temperature of about 180° C to about 300° C, with (B) a polyepoxide compound containing about 2 to about 100 epoxide groups per molecule and having an epoxide group content of about 300 gram equivalents/10^6g to about 9,600 gram equivalents/10^6g and a melting point of not more than about 150° C, in amounts which satisfy the following equation:

$$0.5 \leqq O/C \leqq 2.0$$

wherein O represents the epoxide group content of the polyepoxide compound, and C represents the carboxyl group content of the polyester.

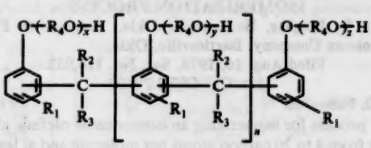
4,087,480

OXYALKYLATED NOVOLAC MODIFIERS FOR POLYVINYL HALIDE COMPOSITIONS

Akio Takahashi, Amherst; Geoffrey H. Smith, North Tonawanda; Brian M. Rushton, Williamsville, and Myron C. Annis, North Tonawanda, all of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 485,044, Jul. 1, 1974, abandoned. This application Jul. 2, 1975, Ser. No. 592,685
Int. Cl.[2] C08L *27/06*
U.S. Cl. 260—847 13 Claims

1. A polymer composition comprising a vinyl halide polymer and an oxyalkylated novolac resin of the formula:



wherein

n has an average value of about 0.2 to 6,

x, y and z are integers from 1 to 25,

R_1 is independently selected from the group consisting of hydrogen, fluorine, chlorine, bromine, and a hydrocarbon radical;

R_2 and R_3 are independently selected from the group consisting of hydrogen, a hydrocarbon radical, and a halogen substituted hydrocarbon radical; and

R_4 is a hydrocarbon radical.

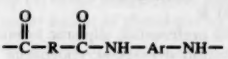
4,087,481

AMORPHOUS COPOLYAMIDE FROM ALIPHATIC/AROMATIC DICARBOXYLIC ACID AND ARYLENE DIISOCYANATE MIXTURE

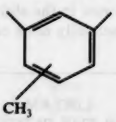
Kemal B. Onder, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 21, 1977, Ser. No. 761,429
Int. Cl.[2] C08G *18/10, 18/06, 69/32*
U.S. Cl. 260—857 TW 15 Claims

1. A solid copolyamide consisting essentially of the recurring unit



wherein, in about 30 percent to about 60 percent of the recurring units, R is $-(CH_2)_x-$ wherein x represents an integer from 7 to 12 inclusive and in about 40 percent to about 70 percent of the recurring units R is m-phenylene, and Ar in about 70 percent to about 95 percent of the recurring units is 4,4'-methylenebis(phenylene) and in the remaining 5 to 30 percent is a tolylene radical having the formula



and provided that when R is at least 50 percent m-phenylene Ar is at least 10 percent tolylene and further provided that said tolylene radicals are present in said copolyamide substantially as polyamide blocks with at least said m-phenylene radicals.

4,087,482

FURFURYL ALCOHOL MODIFIED POLYESTER RESINS CONTAINING METAL ATOMS

Robert C. Shaffer, Playa del Ray, Calif., assignor to Hitco, Irvine, Calif.

Filed Aug. 16, 1976, Ser. No. 714,403
Int. Cl.[2] C08L *67/06*
U.S. Cl. 260—868 4 Claims

1. A copolymer of furfuryl alcohol and a polyester prepolymer which is a condensation product of a slight stoichiometric excess of maleic acid or anhydride and a polyhydric alcohol, said copolymer containing tungsten and/or molybdenum metal atoms, said polyester prepolymer having been reacted with a complex which is a reaction product of tungsten carbonyl and/or molybdenum carbonyl with pyrrolidine.

4,087,483

PREPARATION OF A PRINTING INK BINDER

Dirk J. F. Geerdes, Hoogerheide, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed Dec. 20, 1976, Ser. No. 752,521

Claims priority, application Netherlands, Dec. 22, 1975, 7514901

Int. Cl.[2] C08F *279/02*

U.S. Cl. 260—879 7 Claims

1. The process for the preparation of a printing ink binder having a basis of a cyclopentadiene resin modified with carboxylic acid and subsequently esterified, characterized in that the cyclopentadiene resin is reacted at a temperature in the range of 120° C to 300° C with an ethylenically unsaturated dicarboxylic acid or the anhydride thereof and with a saturated monocarboxylic acid having 3 - 9 carbon atoms, and the resulting acidic reaction mixture is at least partly esterified at a temperature in the range of 140° to 300° C with one or more hydroxy and/or epoxy compounds whose average OH functionality is in the range of 2.1 to 12.

4,087,484

PROCESS FOR PRODUCING TRANSPARENT BLOCK COPOLYMER RESIN

Tamotsu Miki; Akio Imai, and Yuji Kobayashi, all of Ichihara, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 531,072, Dec. 9, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,729

Claims priority, application Japan, Dec. 13, 1973, 48-140150; Feb. 22, 1974, 49-21737

Int. Cl.[2] C08F *297/04*

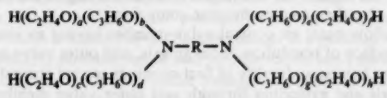
U.S. Cl. 260—880 B 9 Claims

1. In a process for recovering a granular block copolymer from its hydrocarbon solution obtained by block copolymerizing in a hydrocarbon solvent 90 to 65 parts by weight of a styrene-type monomer and 10 to 35 parts by weight of a conjugated diene using an organolithium compound as an initiator, the improvement whereby a transparent block copolymer resin is produced, which comprises

dispersing said block copolymer solution in heated water in the presence of a block-type polyether compound represented by the formula

$$HO(C_2H_4O)_a(C_3H_6O)_b(C_2H_4O)_cH$$

where *a*, *b*, and *c* each represent a number from 10 to 1,000 or the formula



where *a*, *b*, *c*, *d*, *e*, *f*, *g*, and *h* each represent a number from 5 to 1,000, R represents a hydrocarbon radical having 1 to 10 carbon atoms, the content of the (C_2H_4O) portion of said block-type polyether compounds being 30 to 95% by weight and the molecular weight of the polypropylene glycol portion being 1,000 to 5,000

to strip off the solvent from said solution by means of steam stripping and then

recovering the block copolymer granules from water by filtration.

4,087,485

POLYPROPYLENE BLENDS HAVING HIGH IMPACT STRENGTH AND IMPROVED OPTICAL PROPERTIES

Terrence Huff, Baytown, Tex., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Aug. 16, 1976, Ser. No. 714,372

Int. Cl.[2] C08L *23/16*

U.S. Cl. 260—897 A 15 Claims

1. A polypropylene blend having high impact strength and improved optical properties, comprising:

about 70% to about 95% by weight of a polypropylene component, about 1% to about 15% by weight of a low density polyethylene component, said polyethylene having a density of no more than about 0.929 g/cc, and about 2% to about 22% by weight of an ethylene-propylene copolymer elastomer component having a combined ethylene content of at least 50 wt.%, based upon the weight of the elastomer component, the low density polyethylene and elastomer components being at least partially cured in the presence of at least a portion of the polyethylene.

4,087,486

POLYPROPYLENE COMPOSITION CONTAINING EPR

Ivor R. Fielding, Naperville, and Wassily Poppe, Lombard, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed May 15, 1975, Ser. No. 577,685

Int. Cl.[2] C08L *23/16*

U.S. Cl. 260—897 A 5 Claims

1. A polypropylene composition having improved knit-line properties comprising from 5 to 30 parts by weight of a saturated ethylene-propylene rubber, correspondingly 95 to 70 parts by weight crystalline homopolymeric polypropylene and from 0.01 to 0.2 parts by weight of an organic peroxide per each 100 parts by weight of the total concentration of saturated ethylene-propylene rubber and polypropylene.

4,087,487

CARRIERS FOR BIOLOGICALLY ACTIVE COMPOUNDS AND METHODS FOR THE PRODUCTION THEREOF

Otto Wichterle, and Jiri Coupek, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Division of Ser. No. 470,006, May 15, 1974, Pat. No. 3,969,436, which is a continuation-in-part of Ser. No. 387,313, Aug. 10, 1973, abandoned. This application Mar. 26, 1976, Ser. No. 670,854

Claims priority, application Czechoslovakia, Aug. 18, 1972, 5743-72

Int. Cl.[2] C08L *33/04*

U.S. Cl. 260—901 8 Claims

1. A method for the production of carriers for binding biologically active compounds comprising admixing

(a) a primary component comprising a three-dimensional water insoluble polymer of components: (i) at least one monomer selected from the group consisting of lower alkyl acrylates and methacrylates, lower hydroxyalkyl acrylates and methacrylates and diethylene glycol and glycerol monoacrylates and monomethacrylates; (ii) a cross-linking agent selected from the group consisting of lower alkylene glycol diacrylates and dimethacrylates, allyl methacrylate, glycerol dimethacrylate, butantetrol dimethacrylate and N,N'-methylene-bisacrylamide; and (iii) an operative monomer selected from the group consisting of acrylic and methacrylic compounds containing a phenolic or aromatic amine function; and

(b) a secondary component comprising a water-soluble polymer of a hydrophilic monoolefinic monomer selected from the group consisting of acrylic acid, methacrylic acid, itaconic acid, N-lower alkyl substituted acrylamides, lower alkylene glycol monomethacrylates and acrylates, acrylamide and methacrylamide, said water-soluble poly-

mer containing an aromatic diazonium group, for a time sufficient to cause said diazonium group to form covalent bends with said primary component.

4,087,488

CYANO-4-(0,0-DIALKYLPHOSPHORYLOXY)-CYCLOHEX-4-ENES

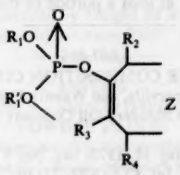
Kaspar F. Burri, West Caldwell, N.J.; Frank Kienzle, Therwill, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Division of Ser. No. 618,853, Oct. 2, 1975, Pat. No. 4,025,584, which is a division of Ser. No. 497,598, Aug. 15, 1974, Pat. No. 3,933,948. This application Feb. 7, 1977, Ser. No. 766,092

Int. Cl.[2] C07F *9/117*

U.S. Cl. 260—940 **4 Claims**

1. A compound of the formula



wherein each of R_1 and R_1' is lower alkyl, aryl or benzyl, each of R_2, R_3 and R_4 is hydrogen or lower alkyl and Z is the residue of a dienophile moiety selected from the group consisting of tetracyanoethylene.

4,087,489

INSECTICIDAL N-POLYCHLOROALLYLAMIDO-THIOPHOSPHORIC ESTERS

Paolo Piccardi; Francesco Corda, both of Milan; Franco Gozzo, Saronno (Varese); Angelo Longoni, and Giovanni Renis, both of Milan, all of Italy, assignors to Montedison S.p.A., Milan, Italy

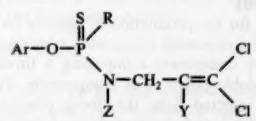
Filed Apr. 27, 1976, Ser. No. 680,694

Claims priority, application Italy, May 2, 1975, 22948 A/75

Int. Cl.[2] A01N *9/36*; C07F *9/24*

U.S. Cl. 260—949 **6 Claims**

1. An N-polychloroallylamido-thiophosphoric ester having the general formula:

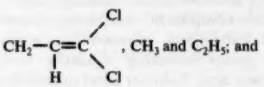


wherein:

Ar is phenyl substituted with from 1 to 3 halogen atoms and/or nitro, methyl or thiomethyl;

R is selected from among CH_3O, C_2H_5O, iso-C_3H_7O, phenyl and phenyl substituted with from 1 to 3 halogen atoms and/or nitro, methyl or thiomethyl;

Z is selected from among H,



, CH_3 and C_2H_5; and

y is selected from among H and Cl.

4,087,490

CYCLIC PHOSPHORYL AND THIOPHOSPHORYL HALIDES

Joseph Herman Lesser, and Ludmila Friedman, both of Beer-Sheva, Israel, assignors to Makhteshim Chemical Works, Ltd., Beer-Sheva, Israel

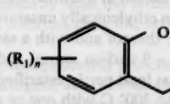
Filed Jul. 20, 1976, Ser. No. 707,093

Claims priority, application Israel, Jul. 31, 1975, 47851; Jul. 31, 1975, 47852

Int. Cl.[2] C07F *9/15*

U.S. Cl. 260—974 **6 Claims**

1. A process for preparing compounds of the formula



wherein

R_1 is selected from the group consisting of hydrogen, alkyl, alkylene having up to 12 carbon atoms, cycloalkyl, aralkyl, aryl, alkaryl, halogen, cyano, nitro, alkoxy, alkylthio, aryloxy, haloalkyl, and haloaryl;

n is an integer from zero to 4;

X is oxygen or sulfur;

Y is chlorine or bromine;

which comprises

reacting an o-hydroxybenzyl alcohol with a phosphoryl or thiophosphoryl trihalide in the presence of an excess of an alkaline earth metal oxide at a temperature between −20° C to the boiling point of the solvent and separating the resultant 2-halo-4H-1,3,2-benzodioxaphosphorin-2-sulfide or -2-oxide.

4,087,491

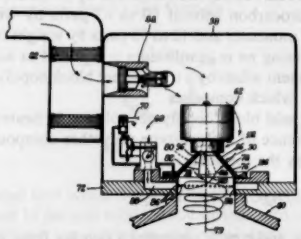
CARBURETOR WITH HOLLOW AIR CONTROL VALVE

Leonard Lee Chapin, El Paso, Tex., assignor to Autotronic Controls, Corp., El Paso, Tex.

Filed Apr. 1, 1977, Ser. No. 783,611

Int. Cl.[2] F02M *9/12*

U.S. Cl. 261—36 A **29 Claims**



1. A carburetor for an internal combustion engine having an intake chamber, said carburetor comprising

a hollow outer air control valve member having an interior surface of revolution about an axis, said outer valve member having a plurality of first openings spaced around said axis and extending through said outer valve member to said interior surface,

a hollow inner air control valve member nesting in said outer valve member and having an exterior surface of revolution mating with said interior surface of revolution and coaxial therewith, said inner valve member confining a coaxial internal mixing chamber having a cross section increasing in the direction away from said mating surfaces and terminating in an open end, said inner valve member having a plurality of second openings corresponding to said first openings and extending between said exterior surface and said mixing chamber,

means for mounting said outer and inner valve members to intercept air inflow into said intake chamber with said open end open into said intake chamber and with said outer and inner valve members being turnable relative to each other about said axis,

means for turning one of said inner and outer valve members relative to the other about said axis to change the overlap of said first and second openings and thereby vary the constriction of air flow at the overlaps to control the rate of air flow into said intake chamber,

said mating surfaces sloping away from said axis in the direction of said open end for directing air flow through each overlap of said first and second openings with an axial component of air flow through such overlap into said mixing chamber parallel to said axis and a transverse component orthogonal to said axial component, said axial component being in the direction of said open end,

means for directing air flow through each such overlap to offset said transverse component from the direction toward said axis, thereby causing a swirling of air within said mixing chamber, and

means for introducing liquid fuel into air swirling within said mixing chamber.

4,087,492

SLOW FUEL SUPPLY SYSTEM

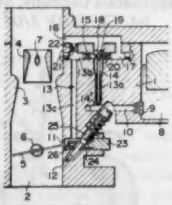
Takanori Onishi; Osamu Kitahara, both of Toyota; Nobuo Shimizu, Ohbu; Takio Suzuki, Takahama; Tetsuo Yamashirodani, Higashiuramachi, and Yozo Ohta, Chiryu, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Aisan Kogyo Kabushiki Kaisha, Ohbu, both of, Japan

Filed Jan. 31, 1977, Ser. No. 764,175

Claims priority, application Japan, Nov. 2, 1976, 51-131956

Int. Cl.[2] F02M *3/08*

U.S. Cl. 261—41 D **2 Claims**



1. In a carburetor system having an intake passage, a throttle valve located in said intake passage, a float chamber, an idle port which is located in said intake passage at a position which is absolutely downstream of said throttle valve, and a slow port which is located in said intake passage at a position which is upstream of said throttle valve when it is set in the fully closed position and is located downstream of said throttle valve when it is slightly opened from the fully closed position, the improvement comprising a slow fuel passage extending from said float chamber to said idle and slow ports, and a slow port plug inserted into said slow fuel passage and having a tip end which faces said slow port, said plug having an oblique bore formed at a middle portion thereof and an axial bore which connects a middle portion of said oblique bore to said tip end, and an idle adjusting screw having a shank portion mounted through said oblique bore.

4,087,493

APPARATUS FOR PROVIDING A UNIFORM COMBUSTIBLE AIR-FUEL MIXTURE

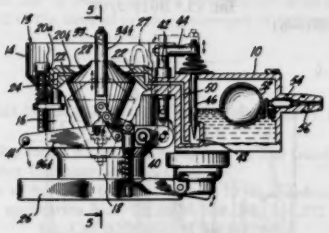
Walter E. Petermann, Caracas, Venezuela, assignor to Carbo-Economy, S.A., Caracas, Venezuela

Continuation of Ser. No. 589,898, Jun. 24, 1975, abandoned. This application Jul. 14, 1977, Ser. No. 815,541

Claims priority, application Switzerland, Feb. 13, 1975, 001740/75; Venezuela, May 22, 1975, 751333/75

Int. Cl.[2] F02M *9/12*

U.S. Cl. 261—44 D **11 Claims**



1. A carburetor for supplying metered amounts of atomized liquid fuel to an internal combustion engine comprising (1) an open generally cylindrical housing having an upper intake air receiving section with a generally ring-like configuration a mixing chamber into which intake air from the upper section passes directly, said mixing chamber defined by a radial wall that extends inwardly from the wall of the housing and forms an opening smaller in diameter than the opening of the upper intake air receiving section, a wall that converges downwardly from the radial wall to a sharp edge forming the smallest opening within the carburetor housing, and a wall that diverges from the sharp edge to the wall of the housing, said mixing chamber also including liquid fuel supply means for supplying liquid fuel into the intake air immediately below the sharp edge of the mixing chamber, a lower turbulence section for passing without obstruction liquid fuel and air directly to the manifold of the internal combustion engine; (2) a regulating member in the configuration of upper and lower cone-like sections arranged with a common base and mounted for reciprocating movement within at least the mixing chamber and the turbulence section, the upper cone-like section of the regulating member functioning to deflect the intake air toward a gradually enlarging constricted zone defined by the upper cone-like section and the diverging wall of the mixing chamber and wherein the liquid fuel is mixed with and atomized by the intake air and the lower cone-like section of the regulating member defining within the turbulence section a turbulence zone wherein the air and liquid fuel exiting from the constricted zone are subjected to turbulence to provide further mixing of the atomized fuel with the intake air; and (3) control means coupled to the regulating member for selectively reciprocating the regulating member in accordance with engine speed substantially axially within the housing to thereby vary the area of the constricted zone and the amount of intake air and liquid fuel mixed therein.

4,087,494

PROCESS FOR THE PRODUCTION OF DYED ACRYLIC FIBRES

Ulrich Reinehr, Dormagen; Hans-Dieter Braun, Wuppertal, and Robert Dippelhofer, Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 11, 1975, Ser. No. 639,821

Claims priority, application Germany, Dec. 14, 1974, 2459212

Int. Cl.[2] D01F *1/04*

U.S. Cl. 264—78 **2 Claims**

1. A process for the production of a dyed filament or fibre of an acrylonitrile polymer, wherein 0.001–3% by weight of

carbon black pigment is added to the polymers before the actual spinning process and the filament or fibre containing said carbon black pigment is dyed after spinning.

4,087,495

ULTRASONIC AIR HUMIDIFYING APPARATUS

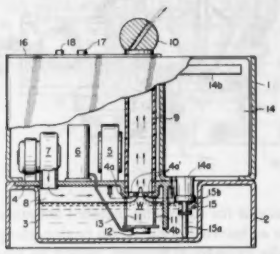
Hidetoshi Umehara, Sagamihara, Japan, assignor to Mikuni Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 23, 1977, Ser. No. 780,643

Claims priority, application Japan, Mar. 25, 1976, 51-35235[U]

Int. Cl.² B01F *3/04*

U.S. Cl. 261—81 **6 Claims**



1. An ultrasonic air humidifying apparatus comprising an upper cabinet, a lower cabinet separably connected with said upper cabinet, a water vessel formed in said lower cabinet, a chassis board interposed between said upper cabinet and said lower cabinet and having a cavity projecting into said water vessel, a high frequency generator and motor blower installed on said chassis board, a conduit pipe having a lower end fitted into said cavity above the surface of water contained in said water vessel and having an upper portion extending therefrom upward through said upper cabinet, a plate member covering said conduit pipe at the lower end and having a plurality of openings, an ultrasonic vibrator assembly set in the water contained in said water vessel vertically below said plate member and connected with said high frequency generator, at least one of said plurality of openings in said plate member being located concentrically with said vibrator assembly and having a size and distance from said water surface such that a conical projection formed by ultrasonic energy on the surface of the water contained in said water vessel can project through said at least one opening into said conduit pipe, whereby the other of said plurality of openings which are not concentrically located with respect to said vibrator assembly will admit the air blown over the surface of the water in said water vessel from said motor blower.

4,087,496

STIRRING APPARATUS FOR TREATING WASTE LIQUIDS

Roger Perrot, Chateauneuf-sur-Sarthe, France, assignor to Nouveaux Etablissements Sueur, Chateauneuf-sur-Sarthe, France, a part interest

Filed Jul. 9, 1976, Ser. No. 703,811

Claims priority, application France, Jul. 22, 1975, 75 22873

Int. Cl.² B01D *47/16*

U.S. Cl. 261—93 **4 Claims**

1. Stirring apparatus for treating waste liquids, comprising:

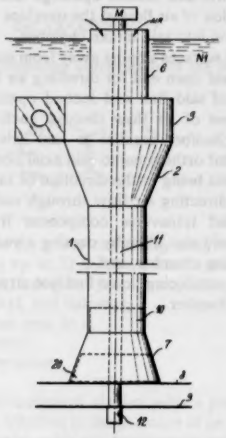
a central cylindrical element having an upper portion and a lower portion;

a hopper connected to the upper portion of said cylindrical element, said hopper being in the shape of a downwardly tapered truncated cone-shaped section;

a carter having a substantially spiral shaped cross-section generally transverse to the central cylindrical element at the top of said hopper, said carter including a top central air inlet and a tangential inlet for the waste liquid;

an upwardly tapered truncated cone-shaped section connected to the lower portion of the cylindrical element;

a ring connected to the bottom of the upwardly tapered truncated cone-shaped section, said ring being generally transverse to the central cylindrical element;



a reaction plate placed substantially parallel to and under said ring;

rotating means being further located at the lower part of the assembly formed by the central cylindrical element and the upwardly tapered truncated cone and means for rotatively driving said rotating means.

4,087,497

COOLING DEVICE

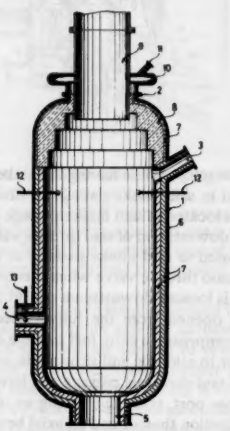
Wolfgang Opitz; Otto Bühring, and Hans Hennen, all of Hurth, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 12, 1977, Ser. No. 796,211

Claims priority, application Germany, May 15, 1976, 2621718

Int. Cl.² B01F *3/04*

U.S. Cl. 261—118 **7 Claims**



1. A cooling device suitable for use in the quenching of combustion gases containing hydrogen chloride, which device

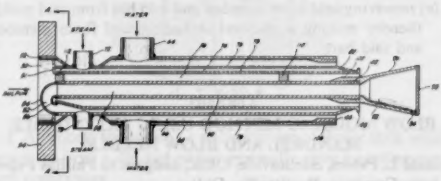
comprises: an elongated steel vessel having rounded end portions, these being, in reference to the orientation of the vessel when it is in use, top and bottom end portions; a generally axial gas-admitting connection provided on the top end portion of the vessel; three to eight inclined connections disposed at substantially uniform angular intervals around a substantially horizontal zone situated in the top third of the vessel, below the rounded top end portion, which connections, in use, receive nozzles for the injection of a quenching liquid circulated around a closed circuit; a lateral connection in the lower third of the vessel, above the rounded bottom end portion, providing, in use, an outlet for quenched combustion gases and quenching liquid; a generally axial connection provided on the bottom end portion of the vessel, whereby assembly, repair, and cleaning operations are facilitated and/or an outlet is provided, in use, for quenching liquid; a hard rubber layer extending over the inner surfaces of the vessel and of the three to eight inclined connections and of the three other connections; an acid-resistant lining within the hard rubber layer; a refractory lining of heat insulating-bricks within the acid-resistant lining in the region above the three to eight inclined connections; a tube of corrosion-resistant steel inserted into the connection on the top end portion of the vessel; a steel compensator surrounding this inserted tube and surmounting the connection on the top end portion, whereby a seal is provided at that end of the vessel and compensation is provided for thermal expansion of the said inserted tube; and an inlet pipe connected to the steel compensator whereby, in use, an inert gas protecting its inner surface against corrosion can be admitted.

4,087,498

METHOD OF PRODUCING SULFUR PARTICLES

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Oct. 31, 1975, Ser. No. 627,660
Int. Cl.[2] B01J *2/06*
U.S. Cl. 264—11 **4 Claims**



1. The method of producing porous sulfur particles having diameters between about 0.02 and 0.4 inch, densities between about 0.9 and about 1.3 grams per cc, pore volumes between about 0.04 and about 0.15 cc per gram including the steps of:

(a) passing a pressurized stream of water through a first conduit having a constriction discharge nozzle and discharging said water from said nozzle at a high linear velocity of about 3 to about 90 feet per second to form a water spray having a vena contracta of about 0.2 to about 15 pipe diameters downstream of said nozzle;

(b) passing a pressurized stream of molten sulfur through a second conduit also having a constriction discharge nozzle and discharging said sulfur stream from said nozzle at a high velocity of about 3 to about 90 feet per second;

(c) blending said sulfur and water streams by discharging said sulfur stream into said vena contracta of said water spray in a direction substantially parallel to said water spray so that said sulfur stream has a radial velocity vector relative to said water stream insufficient to cause said sulfur to penetrate through said water spray, and said sulfur is captivated and surrounded by said water spray and forms a single spray comprising a heterogeneous mixture of intimately mixed sulfur droplets and water droplets;

(d) controlling the flow rates of said water and sulfur streams to form a turbulent region outside of said conduits and provide relative mass flow rates of about 0.6 to about 10 weight parts water per weight part sulfur, disperse said sulfur stream into said sulfur droplets, and cool and solidify said sulfur droplets into said porous sulfur particles having particle diameters of about 0.02 to about 0.4 inch, densities of about 0.9 to about 1.3 grams per cubic centimeter and pore volumes of about 0.04 to about 0.15 cubic centimeters per gram; and

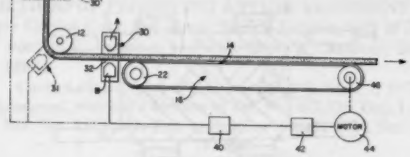
(e) controlling the crushing strength of said porous particles by controlling the temperature of said molten sulfur injected into said water spray at a level within the range of about 238° to 340° F., which temperature level is proportional to the desired crushing strength of said sulfur particles.

4,087,499

METHOD FOR CONTROLLING UNIFORMITY IN TIRE TREAD STOCK

Jack L. Bayonnet, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 602,713, Aug. 7, 1975, abandoned. This application Nov. 12, 1976, Ser. No. 741,272
Int. Cl.[2] B29C *17/00*; D01F *11/02*
U.S. Cl. 264—40.7 **1 Claim**



1. A process for making tire tread stock comprising extruding at a constant rate uncured curable stock continuously downwardly through a tread profile forming extruder die to form a tire tread cross-section profile which cross-section profile is subject to die swell associated with the extruding pressure within the stock as the stock issues from the extruder die, receiving and transporting the tread so formed free of transverse confinement on a horizontal conveyor having an adjustable speed drive, and continuously measuring the thickness between oppositely facing top and bottom surfaces of the tread stock profile so formed at a fixed location along said tread stock where the same is subject to said die swell after its exit from said die and before its contact with said conveyor, and continuously regulating said drive in response to variances in said thickness so measured.

4,087,500

METHOD OF MAKING A DUO DENSITY SILICON NITRIDE ARTICLE

Eugene A. Fisher; Michael U. Goodyear, both of Plymouth; Arthur F. McLean, Ann Arbor, and Karsten H. Styhr, Farmington, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 20, 1973, Ser. No. 426,987
Int. Cl.[2] C04B *35/58, 35/60*
U.S. Cl. 264—42 **6 Claims**

1. A method of making a duo density article of silicon nitride which comprises the steps of:

compacting a mixture consisting of from about 95 to 99.5% by weight silicon nitride particles and from about 5 to 0.5% by weight of a densification aid to at least 98% of theoretical density by use of heat and pressure thereby to form a first element of silicon nitride;

forming the general shape of a second element by (a) injection molding silicon metal particles and a carrier to fform the general shape of said second element, and (b) heating said second element to burn out said carrier;

nitriding said second element so that said element is converted substantially to pure silicon nitride;

bringing a surface area of said first element into close association with a surface area of said second element;

holding said associated surfaces of said first and said second elements so they do not move with respect to one another; and

forming a bond between said associated surfaces of said first and said second elements by applying heat on both elements and pressure on one of said elements while the other of said elements is held thereby to force a portion of the silicon nitride forming said surface area of said one element into bonding relationship with said surface area of the other element.

4,087,501

METHOD FOR THE CONTINUOUS PRODUCTION OF TUBULAR FOAMED PLASTIC PIPE SLEEVES INSULATING

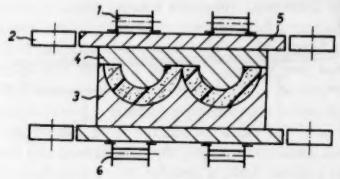
Kurt Moser, Kirchheim, Germany, assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 19, 1976, Ser. No. 650,190

Claims priority, application Germany, Jan. 28, 1975, 2503425

Int. Cl.[2] B29D *27/04*

U.S. Cl. 264—45.8 **6 Claims**



1. A method of making tubular foamed plastic pipe insulating sleeves and the like in continuous length which comprises the steps of

simultaneously advancing a first set of upper and lower juxtaposed mold-carrying endless conveyors respectively supporting and articulating two series of contiguous mold halves which are complementary of each other when brought into confronting relation during the juxtaposed portion of their travel to define a laterally closed, longitudinally extended, mold cavity through said juxtaposed portion of their travel, said cavity defining a plurality of tubular segments disposed longitudinally of the conveyor travel in side-by-side, substantially planar, relation with thin web-forming channels intercommunicating respectively adjacent tubular segments, wherein the size and number of said segments is just sufficient to produce a thick-walled tubular insulating sleeve of smooth internal and external periphery when folded to envelope a pipe having a diameter equal to that of the inner diameter of the sleeve;

dispensing a thermosettable foam-forming material on one of said series of mold halves prior to the closing of the mold;

advancing said closed mold cavity with said foam-forming material therein to allow said material to fill said mold cavity and to become sufficiently cured to be self-supporting;

causing said conveyors to diverge at the end of said juxtaposed portion of their travel to separate said two series of mold halves and cause discharge from said mold cavity of said tubular segments integrally joined by thin webs, wherein as discharged said segments are aligned laterally in substantially planar disposition but which are articulatable along said integrally formed webs to permit hinging said segments to complete said tubular foamed plastic insulating sleeves.

4,087,502

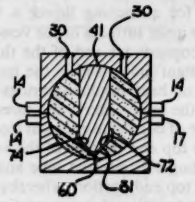
METHOD OF MAKING A COLLAPSIBLE FOAM MANDREL

Alfred C. Hoffmeister, Azusa, Calif., assignor to TRE Corporation, Beverly Hills, Calif.

Division of Ser. No. 561,176, Mar. 24, 1976, Pat. No. 3,988,103. This application Sep. 7, 1976, Ser. No. 721,159

Int. Cl.[2] B29D *3/00, 27/04*

U.S. Cl. 264—46.4 **6 Claims**



1. The method for making a collapsible mandrel, comprising:

(a) removably securing a flexible hinge reinforcing strip to an elongated bar; and

(b) securing said elognated bar against a wall defining a cylindrical mold cavity of a plural part mold, so that said bar extending substantially along the length of said cavity and extends transversely substantially across said cavity;

(c) depositing hardenable foamable material in said mold cavity;

(d) foaming and curing said foamable material to form a rigid foam member and to secure said bar and said strip in said foam member;

(e) removing said foam member and said bar from said mold, thereby making a mandrel including said foam member and said bar.

4,087,503

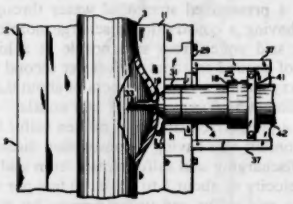
BLOW MOLDING METHOD USING EXTENDABLE MANDREL AND BLOW NEEDLE

Donald L. Peters, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 586,318, Jun. 12, 1975, Pat. No. 3,973,896. This application Apr. 8, 1976, Ser. No. 674,805

Int. Cl.[2] B29C *17/07*

U.S. Cl. 264—89 **3 Claims**



1. A method for blow molding an article, said method comprising:

(a) forming a parison of blow moldable material;

(b) closing blow mold portions on said parison;

(c) moving a member to an extended position and into engagement with said parison and retaining a portion of the parison against movement by applying a vacuum between a portion of said member and a portion of said parison after engagement between the member and the parison;

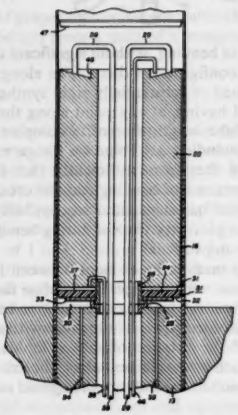
(d) moving a blow needle and puncturing said parison with the blow needle in the area of said parison portion when said member is in the extended position;
(e) moving said member to a retracted position while retaining the parison portion in engagement with the member portion;
(f) introducing blow air into said parison during movement of the member to the retracted position through said blow needle and blowing an article from said parison;
(g) opening said blow mold portions; and
(h) removing said article.

4,087,504

THERMOPLASTIC COOLING METHOD

Philip Hugh Carrico, Greenfield Center, N.Y., assignor to General Electric Company, Hudson Falls, N.Y.

Division of Ser. No. 553,934, Feb. 28, 1975, Pat. No. 4,008,022. This application Jul. 16, 1976, Ser. No. 705,809
Int. Cl.[2] B29D *23/04*
U.S. Cl. 264—89 **6 Claims**



1. A process for cooling a polypropylene tubular stalk which emanates from a die and passes upwardly over a cooling mandrel comprising
a. positioning an upwardly facing beveled edge seal between said die and said mandrel to define a thin space above said seal and to engage the periphery of the tube in sealing relationship,
b. introducing deaerated water at low pressure into said thin space above said seal to be taken up by the action of said stalk passing over said beveled edge and flow as a heat transfer film over said mandrel,
c. and introducing steam at low pressure below said seal to leak past said seal and condense in contact with the water in said space.

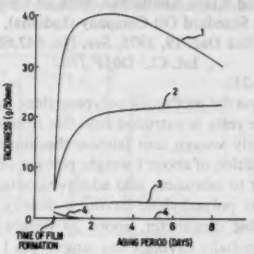
4,087,505

PROCESS FOR PREPARING TACKY POLYOLEFIN FILM

Masaaki Sugimoto; Yoshio Matsumoto; Nobushige Ikeya, and Koichi Hasegawa, all of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Aug. 30, 1976, Ser. No. 718,551
Claims priority, application Japan, Aug. 28, 1975, 50-104292; Jun. 15, 1976, 51-70205
Int. Cl.[2] B29D *7/22*
U.S. Cl. 264—95 **17 Claims**

1. A process for preparing a tacky polyolefin film which comprises forming a film by using a composition comprising 98.5 to 88 wt.% of a polyolefin resin, 0.5 to 6 wt.% of a low



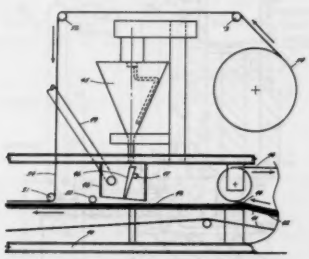
grade polyolefin and 1 to 6 wt.% of a tackifier and then aging the resulting film.

4,087,506

METHOD OF PRODUCING A FLUID ABSORBENT WEB

Roy Gordon Cook, and James Patrick Jackson, both of Greenwood, S.C., assignors to Parke, Davis & Company, Detroit, Mich.

Continuation-in-part of Ser. No. 556,243, Mar. 7, 1975, abandoned, which is a division of Ser. No. 402,326, Oct. 1, 1973, Pat. No. 3,888,257. This application Aug. 5, 1976, Ser. No. 711,908
Int. Cl.[2] D04H *1/20*
U.S. Cl. 264—112 **3 Claims**



1. A method of producing a fluid absorbent web for the manufacture of disposable absorbent articles such as diapers, underpads and sanitary napkins, which includes the steps of forming on a carrier layer a dimensionally uniform horizontally moving web of fiberized wood pulp having a body, top and bottom surfaces, and a central zone; applying water absorbent polymer particles onto the top surface across the central zone of the moving web by means of a spreader having a delivery end corresponding in width to the width of the central zone, in the amount of about 1 to 11.5 parts by weight of wood pulp fiber in the central zone for each part by weight of polymer; and distributing the surface applied particles into the central zone of the moving web by air pressure means such that the particles become mutually dispersed within voids in the body of the central zone of the web, the steps being carried out at a constant rate to produce a web having polymer-free lateral zones and a polymer-containing central zone.

4,087,507

PROCESS FOR IMPROVING THE PRODUCTION EFFICIENCY OF WOVEN POLYPROPYLENE FABRICS

Peter Haas, and Klaus Koblischke, both of Gronau, Germany, assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Dec. 19, 1975, Ser. No. 642,680
Int. Cl.[2] D01F 1/02
U.S. Cl. 264—211 2 Claims

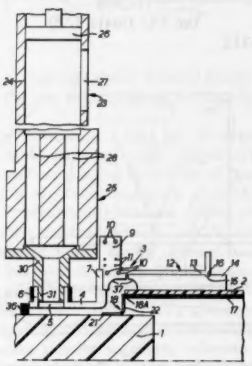
1. In a process for producing polypropylene fabrics, wherein polypropylene resin is extruded into flat ribbon yarns which are subsequently woven into fabrics, the improvement comprising the addition of about 1 weight percent of an additive to the resin prior to extrusion, said additive containing about 79 weight percent polyethylene having a density of about 0.92 grams per cubic centimeter, about 20 weight percent silica particles substantially having a size range from 1 to 20 microns, and about 1 weight percent N-n-hexadecylacetoacetamide, whereby greatly improved production efficiency is achieved with relatively little effect on the luster of the ribbon yarns.

4,087,508

INJECTION WELDING APPARATUS

William George Frederick Slaughter, Whitton; Peter William Pledger, and John Patrick Auriole Lowry, both of London, all of England, assignors to The Post Office, London, England

Filed Jan. 3, 1977, Ser. No. 755,993
Int. Cl.[2] B29C 5/00, 27/00; B29F 1/00
U.S. Cl. 264—262 14 Claims



1. The method for joining an outer thermoplastics sheath of a cable end portion and an end portion of a thermoplastics sleeve disposed about said sheath, comprising

(A) disposing about the cable end portion a sealing disc having an aperture therein and a generally axially extending lip projecting from a major peripheral edge thereof,

(B) disposing said lip between said end portion of said sleeve and an end of a supporting cylindrical member within said sleeve and clamping said lip between said member and said sleeve,

(C) enclosing said end portions including said disc in a mould cavity, and

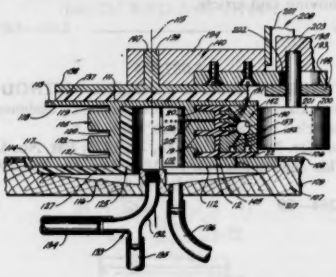
(D) injecting molten thermoplastics material compatible with said sleeve and said sheath into said cavity and about said sheath and said end portion of said sleeve to weld them together.

4,087,509

METHOD FOR MANUFACTURE OF WINDOW WITH EXTRUDED SYNTHETIC FRAME AND THE LIKE

John I. Gates, 114 Via Mentone, Newport Beach, Calif. 92660

Continuation-in-part of Ser. No. 329,661, Feb. 5, 1973, abandoned, which is a division of Ser. No. 145,866, May 21, 1971, abandoned. This application May 20, 1974, Ser. No. 471,275
Int. Cl.[2] B29F 5/00
U.S. Cl. 264—295 22 Claims



1. A method of bending, without significant distortion of the cross-sectional configuration thereof, an elongate non-tubular element fabricated of substantially rigid synthetic thermoplastic material and having, at any point along the length thereof transversely of the length thereof, a complex cross-sectional configuration including a web and a flange extending a substantial distance therefrom sufficiently that the element has preferential directions of bending and the cross-sectional configuration thereof has substantial susceptibility to significant distortion of the geometry thereof during bending, the method comprising the steps of

(a) intimately mating the element between first and second dies cooperatively configured to define the curvature and configuration to which the element is to be bent and cooperatively profiled to mate intimately with substantially the entirety of the exterior of said complex cross-sectional configuration of the element along the extent thereof to be bent for maintaining and supporting said complex configuration,

(b) heating the mated element along at least a portion of the extent thereof to be bent with a heating fluid sufficiently to cause the thermoplastic material to lose a substantial portion but not all of its rigid characteristics,

(c) continuing heating of the element along the extent thereof to be bent and, in conjunction therewith, moving the dies into intimately mating and cross-sectional configuration supporting engagement with the element over said extent of the element thereby to bend the element to the desired curve, and

(d) cooling the element over said extent sufficiently to restore rigid characteristics to the material while maintaining the element mated between the dies.

4,087,510

PROCESS FOR EXTRACTING METALS FROM SPENT DESULPHURIZATION CATALYSTS

Gerhard E. W. K. Steenken, Berzbuir, Germany, assignor to Akzona Incorporated, Asheville, N.C.

Filed Dec. 18, 1975, Ser. No. 642,217
Claims priority, application Netherlands, Dec. 19, 1974, 7416555
Int. Cl.[2] C01G 39/00, 31/00
U.S. Cl. 423—53 5 Claims

1. A process for the extraction of vanadium and molybdenum from a spent desulfurization catalyst containing the same, and having an aluminum oxide carrier, said spent catalyst not having been subjected to previous oxidative roasting, comprising the steps of:

(a) intimately admixing comminuted spent catalyst with an

amount of a solid alkali metal carbonate sufficient to convert the vanadium, molybdenum, and any sulfur which may be present, into water-soluble compounds;

(b) heating the mixture produced in step (a) in the solid state in the presence of air at a temperature between about 650° C and about 850° C for a period between about 1 and about 2 hours; and

(c) leaching the product of step (b) with water to dissolve the vanadium and molybdenum compounds and recovering said compounds from the extract;

the amount of solid alkali metal carbonate also being sufficient so that the extract of step (c), after filtration, has a pH higher than 7.5 but lower than 10.0.

4,087,511
GLASSES PREPARED BY THE MELTING OF STOICHIOMETRIC COMPOUNDS

Richard C. Ropp, Warren, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 633,776, Nov. 20, 1975, abandoned. This application Mar. 22, 1977, Ser. No. 780,202

Int. Cl.² C03C *3/00, 3/12*

U.S. Cl. 423—277 **38 Claims**

1. A method of preparing a water-insoluble chemically durable glass composition from a melt of a compound of the formula

$$M(H_aX_bO_c)_d$$

wherein M is a metal of the group consisting of aluminum, zinc, cadmium, iron, tin, manganese, lead, nickel, cobalt, gallium and indium and the alkaline earth metals beryllium, magnesium, calcium, strontium and barium; X is an anionic species selected from the group consisting of phosphorus, boron, arsenic, sulfur, germanium and tellurium; *a* has a value of 1 to 3; *b* has a value of 1 to 4; *c* has a value of 1 to 10, *d* is 2 or 3 depending upon the valence of M, and said values of *a, b, c* and *d* are determined by the chemistry of the compound being prepared, which comprises preparing a purified solid stoichiometric compound of said formula by forming an aqueous solution from an acid of said anionic species with said metal, wherein said acid is in amounts of at least 40% excess, purifying said solution containing metal and anionic species, by isolating said solid compound from said aqueous acid solution of said metal and said anionic species, removing substantially all excess of remaining acid, heating said purified stoichiometric compounds at elevated temperature in a controlled heating cycle in a sequence of increased temperatures to effect a chemical intrareaction and form a substantially homogeneous melt, and retaining said melt until polymerization of said compound is essentially complete.

4,087,512
PROCESS FOR REMOVING SOLID ORGANIC MATERIAL FROM WET-PROCESS PHOSPHORIC ACID

Stanton L. Reese, and William M. Leaders, both of Lakeland, Fla., assignors to Uranium Recovery Corporation, Mulberry, Fla.

Continuation of Ser. No. 617,150, Sep. 26, 1975, abandoned, which is a continuation-in-part of Ser. No. 301,766, Oct. 30, 1972, abandoned. This application Mar. 15, 1977, Ser. No. 777,659

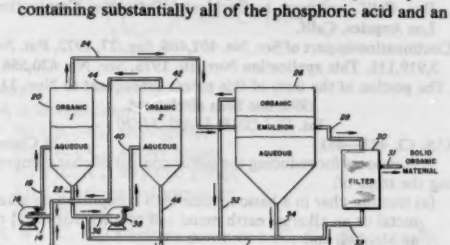
Int. Cl.² C01B *25/16*

U.S. Cl. 423—321 R **18 Claims**

1. A process for removing solid organic material from wet-process phosphoric acid derived from the acidulation of uncalcined phosphate rock without otherwise altering the chemical composition of aqueous solution comprising:

a. mixing the wet-process phosphoric acid with a liquid consisting essentially of one or more hydrocarbons at a temperature of not less than about 55° C nor more than about 70° C and at a volume ratio of aqueous to organic up to about 30:1 so that the aqueous phase is continuous to emulsify substantially all of said organic material in said liquid hydrocarbon;

b. allowing the mixture to separate into an aqueous phase containing substantially all of the phosphoric acid and an



organic phase containing substantially all of said solid organic material; and

c. separating the phosphoric acid aqueous phase from the organic phase.

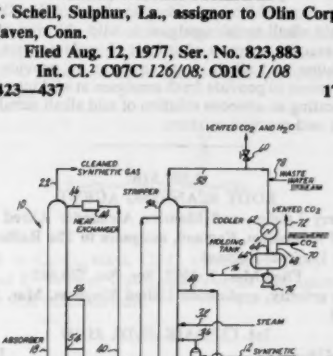
4,087,513
METHOD OF HYDROLYZING UREA CONTAINED IN WASTE WATER STREAMS

Lorenz P. Schell, Sulphur, La., assignor to Olin Corporation, New Haven, Conn.

Filed Aug. 12, 1977, Ser. No. 823,883

Int. Cl.² C07C *126/08;* C01C *1/08*

U.S. Cl. 423—437 **17 Claims**



1. In a process which comprises hydrolyzing urea which is contained in a waste water stream, the improvement which comprises effecting said hydrolysis in a carbon dioxide recovery system wherein

(a) carbon dioxide is absorbed into an aqueous solution from a gas mixture,

(b) said absorbed carbon dioxide and water vapor are stripped from said aqueous solution,

(c) said stripped mixture of carbon dioxide and water vapor is cooled in order to condense a major portion of said water vapor into liquid water,

(d) said liquid water is separated from said carbon dioxide, and

(e) said liquid water is recycled back to said stripping step (b).

4,087,514

PROCESS FOR DESULFURIZING CHAR

Leon Robinson, Houston, Tex., and Hans F. Bauer, Diamond Bar, Calif., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 401,408, Sep. 27, 1973, Pat. No. 3,919,118. This application Nov. 10, 1975, Ser. No. 630,556
The portion of the term of this patent subsequent to Nov. 11, 1992, has been disclaimed.
Int. Cl.[2] C01B *57/00, 31/20*
U.S. Cl. 423—461 29 Claims

1. A process for reducing the sulfur content of char comprising the steps of:
(a) treating char in a basic molten bath comprising an alkali metal or an alkaline earth metal salt of a hydroxylaryl or an alcohol; and
(b) substantially separating said char from said basic molten bath.

4,087,515

PROCESS FOR THE PRODUCTION OF ALKALI METAL CHLORITES

J. Stanley Miller, North Haven, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Jun. 30, 1976, Ser. No. 701,257
Int. Cl.[2] C01B *11/10*
U.S. Cl. 423—472 11 Claims

1. A process for producing an alkali metal chlorite having a low concentration of soluble mercury which comprises:
a. admixing an alkali metal amalgam with chlorine dioxide and water at an interface to form a reaction mixture,
b. maintaining said reaction mixture at a pH of from about 9.7 to about 10.8 by providing an excess of the alkali metal of said alkali metal amalgam to said chlorine dioxide in said reaction mixture of at least 10 mole percent,
c. agitating said alkali metal amalgam to provide vertical movement to provide fresh amalgam at said interface, and
d. separating an aqueous solution of said alkali metal chlorite from said reaction mixture.

4,087,516

BODY SCANNING AGENT

John Barry Laidler, and Maurice Alexander Alfred Stewart, both of Amersham, England, assignors to The Radiochemical Centre Limited, England

Filed Mar. 7, 1977, Ser. No. 775,643
Claims priority, application United Kingdom, Mar. 19, 1976, 11295/76
Int. Cl.[2] A61K *29/00, 43/00*
U.S. Cl. 424—1 11 Claims

11. A method of visualising the liver of a mammal which comprises injecting into the mammal an amount of the Technetium-99m labelled tin colloid claimed in claim 10 to contain from 1 to 15 mCi of Technetium-99m, allowing the Technetium-99m to become located in the liver, and observing the gamma-radiation emitted by the liver.

4,087,517

METHOD OF DRY LUBRICATING THE SKIN

Howard L. Scott, Philadelphia, Pa., assignor to Charles L. Wragg, Jr.; Fabalon, Inc.; Beverly Wragg and Karen & Wendy Scott Trust, all of Philadelphia, Pa., part interest to each

Continuation-in-part of Ser. No. 516,817, Oct. 21, 1974, Pat. No. 3,932,614, which is a continuation-in-part of Ser. No. 230,487, Feb. 2, 1972, abandoned. This application Jan. 12, 1976, Ser. No. 648,262
The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.
Int. Cl.[2] A61K *7/00, 7/035, 7/48, 31/74*
U.S. Cl. 424—69 1 Claim

1. A method of lubricating human and animal skin which comprises applying to said skin (a) lubricatingly effective amount of a lubricating agent selected from the group consisting of polytetrafluoroethylene, polyhexafluoropropylene, polychlorotrifluoroethylene and a copolymer of tetrafluoroethylene and hexafluoropropylene, and (b) a diluent for said lubricating agent, said diluent being selected from the group consisting of talc and oil.

4,087,518

FOAMING AND CONDITIONING PROTEIN-CONTAINING DETERGENT COMPOSITIONS

Rory James Maxwell Smith, Rowlands Gill, England, and Gordon John Mackie, Strombeek-Bever, Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 11, 1976, Ser. No. 665,849
Claims priority, application United Kingdom, Mar. 17, 1975, 11003/75
Int. Cl.[2] A61K *7/06*
U.S. Cl. 424—70 10 Claims

1. A foaming and conditioning detergent composition having an enhanced mildness effect towards keratin comprising:
(a) from about 5 to about 50% by weight of the composition of a surfactant combination which is:
(i) an alkylbenzene sulfonate salt in which the alkyl group is selected from the group consisting of straight chain and branched chain alkyl groups containing from eight to eighteen carbon atoms and in which the cation is selected from the group consisting of alkali metal, alkaline earth metal, ammonium and alkanolammonium radicals;
(ii) an auxiliary surfactant selected from the group consisting of synthetic anionic surfactants other than those defined in (i) above, natural anionic surfactants, nonionic surfactants, amphoteric surfactants, zwitterionic surfactants and mixtures thereof;
(b) from about 0.5 to about 10% by weight of the composition of a modified protein having a molecular weight greater than about 5,000 l **and having an isoionic point (pI) greater than about pH** 6, said modified protein being a hydroxyalkylated gelatin; and
(c) the balance of the composition comprising a carrier;
wherein the weight ratio of (i) to (ii) is from about 1.5:1 to about 10:1 and wherein the weight ratio of (a) to (b) is from about 4:1 to about 500:1.

4,087,519

MEDICAMENT FOR THE TREATMENT OF HEPATITIS AND/OR ACUTE OR CHRONIC INFECTIONS DUE TO THE VIRUS OF HEPATITIS B

Christian G. Trépo, Bron, France, assignor to Institut Merieux, Lyon, France

Filed Dec. 20, 1976, Ser. No. 752,790
Claims priority, application France, Dec. 23, 1975, 75 39493
Int. Cl.[2] A61K *39/42, 39/12;* C07G *7/00*
U.S. Cl. 424—86 9 Claims

1. A medicament which contains, in a physiologically acceptable medium, a gamma-globulin preparation containing an effective amount of anti-e antibodies, the said preparation being obtained from serum or blood plasma or from placentary extracts and the said preparation being free from substantially all normal blood protein constituents other than gamma-globulins and from substantially all infectious contaminants.

7. A process for eliminating or reducing the infectiousness of a biological liquid which contains the virus of hepatitis B or antigen-e comprising contacting said liquid with a gamma-globulin preparation containing an effective amount of anti-e antibodies, the said preparation being obtained from serum or blood plasma or from placentary extracts and the said preparation being free from substantially all normal blood protein constituents other than gamma-globulins and from substantially all infectious contaminants.

4,087,520

LOWERING BLOOD PRESSURE WITH NEW L-3-(3,4-DIHYDROXYPHENYL)-2-METHYL-ALANINE PEPTIDES

Franz Braun, Rimbach, Austria; Kurt Stach, deceased, late of Mannheim-Waldhof, Germany; by Werner Plattner, executor, Linz, Austria; Max Thiel, Mannheim, Germany; Gisbert Sponer, Hemsbach, Germany, and Karl Dietmann, Mannheim-Vogelstang, Germany, assignors to Boehringer Mannheim GmbH, Mannheim-Waldhof, Germany

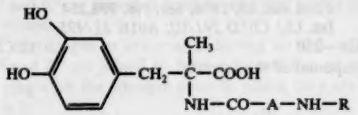
Filed Mar. 9, 1976, Ser. No. 665,341

Claims priority, application Germany, Mar. 12, 1975, 2510634

Int. Cl.[2] A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **13 Claims**

1. An L-3-(3,4-dihydroxyphenyl)-2-methyl-alanine peptide of the formula



wherein

A is an alkylene radical having up to 5 carbon atoms which can be substituted by a hydroxyl group or by a phenyl radical which optionally carries at least one hydroxyl group, and

R is a hydrogen atom or a lower alkyl radical or a glycyl or alanyl radical,

or a pharmacologically compatible salt thereof.

4,087,521

ARTHROPODICIDAL AND NEMATOCIDAL PHOSPHORAMIDATES

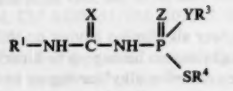
Harold E. Aller, Norristown; Edward E. Kilbourn, Chalfont; Ernest D. Weiler, Ambler, and William D. Weir, Levittown, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Mar. 1, 1976, Ser. No. 662,743

Int. Cl.[2] A01N *9/36;* **C07F** *9/24*

U.S. Cl. 424—211 **14 Claims**

1. A method of controlling pests which comprises applying directly to the pests or to the loci to be freed of or protected from attack by such pests, a pesticidally effective amount of a compound of the formula



wherein

R^1 is a (C_6–C_{10}) aryl group, optionally substituted with up to five (C_1–C_4) alkyl groups, (C_1–C_4) alkoxyl groups, (C_1–C_4) alkylthio groups; (C_1–C_4) alkylsulfonyl groups, (C_1–C_4) hydroxyalkyl groups, (C_1–C_4) haloalkyl groups, cyano groups, nitro groups, hydroxyl groups, or halogen atoms;

R^3 is a (C_1–C_6) alkyl group;

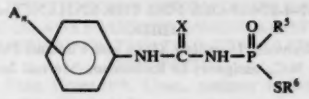
R^4 is a (C_1–C_4) alkyl group;

X is an oxygen or sulfur atom;

Y is an oxygen or sulfur atom; and

Z is an oxygen or sulfur atom and the agronomically acceptable metal sales and metal salt complexes thereof.

2. A compound of the formula:



wherein

A is independently

(a) a (C_1–C_4) alkyl group;

(b) a (C_1–C_4) alkoxy group;

(c) a (C_1–C_4) alkylthio group;

(d) a trihalomethyl group; or

(e) a halogen atom;

R^5 is a (C_1–C_4) alkylthio group or a (C_1–C_4) alkoxy group;

R^6 is a (C_1–C_4) alkyl group;

X is an oxygen or sulfur atom; and

n is an integer from 0 to 3 and the agronomically acceptable metal salts and metal salt complexes thereof.

4,087,522

AMIDES OF PHOSPHONOACETIC ACID FOR TREATING HERPES SIMPLEX VIRUS TYPE 1 AND 2 INFECTIONS

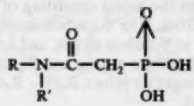
Anne Mary Von Esch, North Chicago, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Sep. 8, 1976, Ser. No. 721,611

Int. Cl.[2] A61K *31/66*

U.S. Cl. 424—211 **9 Claims**

1. A method for treating herpes simplex virus types 1 and 2 infections in an animal which comprises administering topically to an animal so infected, a composition containing from 0.2 percent to 10 percent of an amide of phosphonoacetic acid of the formula



wherein R = C_2–C_{10} alkyl, C_3–C_8 cycloalkyl, benzy, or adamantyl; and R′ = H or C_2–C_{10} alkyl, or its pharmaceutically acceptable acid addition salts.

4,087,523

INSECTICIDAL PYRETHROID COMPOSITIONS

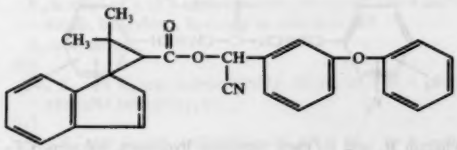
James Byron Lovell, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 20, 1975, Ser. No. 623,864

Int. Cl.[2] A01N *9/02, 9/20, 9/30, 9/36*

U.S. Cl. 424—218 **9 Claims**

1. An insecticidal composition comprising (i) about 1 to 100 ppm of a phenoxybenzyl ester of a spirocarboxylic acid having a formula



wherein represents a single or a double bond; the optical or geometric isomers thereof; and (ii) about 1000 ppm N′-(4-chloro-o-tolyl)-N,N-dimethylformamidine.

4,087,524

ANDROST-4-EN-19-OLS FOR THE ENHANCEMENT OF LIBIDO

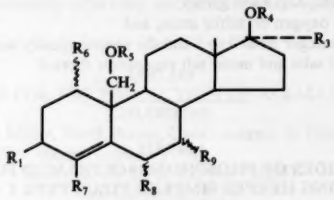
Joyce F. Grunwell, Hamilton, Ohio, and Vladimir Petrow, Chapel Hill, N.C., assignors to Richardson-Merrell Inc., Wilton, Conn.

Continuation-in-part of Ser. No. 461,011, Apr. 15, 1974, which is a continuation-in-part of Ser. No. 329,849, Feb. 5, 1973, abandoned. This application Feb. 7, 1977, Ser. No. 766,238

Int. Cl.[2] A61K *31/56*

U.S. Cl. 424—238 **5 Claims**

1. A method of enhancing the libido of primates in need thereof which comprises the administration to such primate of a therapeutically effective amount of an androst-4-en-19-ol having the formula



wherein

R_1 is selected from the group consisting of H_2, oxo and $H(OR_2)$,

R_2, R_4 and R_5 are each selected from the group consisting of hydrogen, acyl having from 1 to 12 carbon atoms, lower alkyl having from 1 to 3 carbon atoms, trialkylsilyl in which the alkyl group has from 1 to 5 carbon atoms, triphenylsilyl, 2-tetrahydropyranyl, 4-tetrahydropyranyl, 1-cycloalkenyl having from 5 to 7 carbon atoms, 1-methoxycycloalkyl and 1-ethoxycycloalkyl in which the cycloalkyl group has from 5 to 7 carbon atoms,

R_3 is selected from the group consisting of hydrogen, lower alkyl having from 1 to 6 carbon atoms, lower alkenyl having from 2 to 6 carbon atoms, and lower alkynyl having from 2 to 6 carbon atoms, and R_3 and

OR_4 when taken together is oxo, R_6, R_7, R_8 and R_9 are hydrogen and methyl.

4,087,525

PENTADIENONE HYDRAZONES AS INSECTICIDES

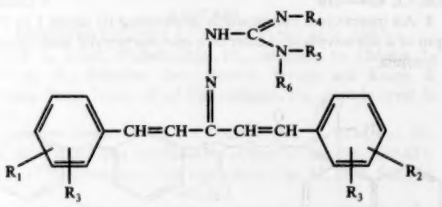
James Byron Lovell, Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 638,252, Dec. 8, 1975, abandoned. This application May 2, 1977, Ser. No. 793,117

Int. Cl.[2] A01N *9/20, 9/22*

U.S. Cl. 424—244 **25 Claims**

1. A method for controlling insects comprising, contacting the insect, or their habitat, with an insecticidally effective amount of a compound having the structure:



wherein R_1 and R_2 each represent hydrogen, halogen, CF_3, C_1–C_4 alkyl, C_1–C_3 alkoxy or C_1–C_4 alkylthio; R_3 is hydrogen or methyl, provided that when R_3 is methyl, R_1 and R_2 are also methyl; R_4 and R_5 represent hydrogen or C_1–C_4 alkyl, and when taken together, an alkylene group of 2 to 6 carbon atoms, a methyl substituted or a phenyl substituted alkylene group of 2 to 4 carbon atoms, a dimethyl substituted alkylene group of 2 to 4 carbon atoms or 1,2-cyclohexylene; and R_6 is hydrogen or C_1–C_4 alkyl; or salts thereof.

4,087,526

(3-AMINO-5-SUBSTITUTED-6-FLUOROPYRAZINOYL OR PYRAZAMIDO)-GUANIDINES AND THEIR DERIVATIVES BEARING SUBSTITUENTS ON THE GUANIDINO NITROGENS

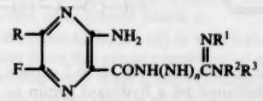
Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 23, 1976, Ser. No. 708,254

Int. Cl.[2] C07D *241/02;* A61K *31/495*

U.S. Cl. 424—250 **12 Claims**

1. A compound of the formula:



wherein

R is amino, lower alkylamino having up to 5 carbon atoms, or diloweralkylamino having up to 5 carbon atoms;

R^1 is hydrogen or lower alkyl having up to 5 carbon atoms;

R^2 is hydrogen, lower alkyl having up to 5 carbon atoms, hydroxy ethyl, lower alkenyl having up to 3 carbon atoms, phenyl, benzyl or phenethyl, halo or lower alkyl substituted phenyl or halo or lower alkyl substituted benzyl or phenethyl;

R^1 and R^2 are joined to form an alkylene bridge of 2 carbon atoms;

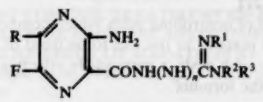
R^3 is hydrogen or lower alkyl having up to 5 carbon atoms;

R^2 and R^3 are joined to form a pyrrolidine or morpholine ring with the nitrogen atom to which they are attached;

n is 0;

and the non-toxic pharmaceutically acceptable salts thereof.

7. A pharmaceutical composition consisting essentially of a compound of the formula:



wherein

R is amino, lower alkylamino having up to 5 carbon atoms, or diloweralkylamino having up to 5 carbon atoms;

R^1 is hydrogen or lower alkyl having up to 5 carbon atoms;

R^2 is hydrogen, lower alkyl having up to 5 carbon atoms, hydroxy ethyl, lower alkenyl having up to 3 carbon atoms, phenyl, benzyl or phenethyl, halo or lower alkyl substituted phenyl or halo or lower alkyl substituted benzyl or phenethyl;

R^1 and R^2 are joined to form an alkylene bridge of 2 carbon atoms;

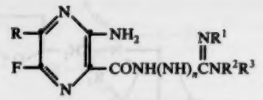
R^3 is hydrogen or lower alkyl having up to 5 carbon atoms;

R^2 and R^3 are joined to form a pyrrolidine or morpholine ring with the nitrogen atom to which they are attached;

n is 0;

and the non-toxic pharmaceutically acceptable salts thereof.

10. A method of treating edema and/or hypertension which consists essentially of administering to a patient in need of such treatment a compound of the formula:



wherein

R is amino, lower alkylamino having up to 5 carbon atoms, or diloweralkylamino having up to 5 carbon atoms;

R^1 is hydrogen or lower alkyl having up to 5 carbon atoms;

R^2 is hydrogen, lower alkyl having up to 5 carbon atoms, hydroxy ethyl, lower alkenyl having up to 3 carbon atoms, phenyl, benzyl or phenethyl, halo or lower alkyl substituted phenyl or halo or lower alkyl substituted benzyl or phenethyl;

R^1 and R^2 are joined to form an alkylene bridge of 2 carbon atoms;

R^3 is hydrogen or lower alkyl having up to 5 carbon atoms;

R^2 and R^3 are joined to form a pyrrolidine or morpholine ring with the nitrogen atom to which they are attached;

n is 0;

and the non-toxic pharmaceutically acceptable salts thereof.

4,087,527

SUBSTITUTED PYRROLOQUINOXALINONES AND DIONES

Richard E. Holmes, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 772,154, Feb. 25, 1977. This application Sep. 26, 1977, Ser. No. 836,830

Int. Cl.² A61K *31/33*

U.S. Cl. 424—250 **2 Claims**

1. A method of treating vascular thrombosis according to the method of claim 2 in mammals which comprises administering to a mammal in need of such treatment an amount of 6-phenyl-1H-pyrrolo-[1,2,3-de]quinoxalin-2,5[3H,6H]-dione effective for treating vascular thrombosis.

4,087,528

2,4-DIAMINO-5-BENZYLPYRIMIDINES

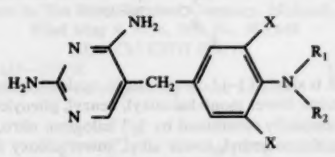
Thomas John Perun, Libertyville; Ronald Robert Rasmussen, and Bruce Wayne Horrom, both of Waukegan, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 601,118, Jul. 31, 1975, Pat. No. 4,008,236. This application Oct. 26, 1976, Ser. No. 735,301

Int. Cl.² A61K *31/305;* C07D *239/48*

U.S. Cl. 424—251 **8 Claims**

1. An antibacterial composition containing as the antibacterial components a compound of the formula



wherein R_1 is H or loweralkyl; R_2 is H, loweralkyl or R_3CO wherein R_3 is H or loweralkyl, and x is a halogen or a pharmaceutically-acceptable acid addition salt thereof; and a sulfonamide selected from the group consisting of sulfadiazine, sulfamethoxazole, sulfamethazine and sulfamerazine, said components being present in a ratio of between 1:1 and 1:20.

4,087,529

THERAPEUTIC COMPOSITION CONTAINING AN N-MONO (ALKOXY-METHYL) PHENOBARBITAL AND A METHOD OF TREATING CONVULSIONS THEREWITH

Julius A. Vida, Greenwich, Conn., assignor to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 616,498, Sep. 24, 1975, Pat. No. 4,054,565, which is a division of Ser. No. 434,385, Jan. 18, 1974, Pat. No. 3,948,896, which is a continuation-in-part of Ser. No. 336,424, Feb. 28, 1973, abandoned. This application Mar. 24, 1977, Ser. No. 781,027

Int. Cl.² A61K *31/515*

U.S. Cl. 424—254 **6 Claims**

1. A therapeutic composition for the treatment of convulsions in warm-blooded animals which comprises a physiologically acceptable carrier and an anticonvulsant effective amount of an N-mono(alkoxymethyl)phenobarbital in which the alkoxy group has from 1 to 4 carbon atoms.

4,087,530

SUBSTITUTED 6-PHENYL-OCTAHYDROBENZO [c] [1,6] NAPHTHYRIDINES

Hans Ott, Pfeffingen, and Süess, Rudolf, Bettingen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

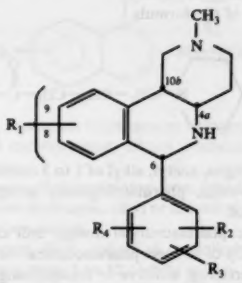
Continuation-in-part of Ser. No. 545,540, Jan. 30, 1975, abandoned. This application Mar. 25, 1976, Ser. No. 670,111

Claims priority, application Switzerland, Feb. 5, 1974, 1550/74; United Kingdom, Sep. 17, 1975, 38177/75; Sep. 17, 1975, 18178/75

Int. Cl.² C07D *217/04;* A61K *31/47*

U.S. Cl. 424—258 **72 Claims**

1. A compound of formula I,



I

wherein the indicated radical in the 8 or 9 position of the benzonaphthyridine structure (R_1) is hydrogen, alkoxy of 1 to 4 carbon atoms or hydroxy, and

(i)

R_2 hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, benzyloxy, hydroxy, halogen, nitro, amino, dimethylamino, or —NHCOR$_5$ wherein R_5 is hydrogen or alkyl of 1 to 4 carbon atoms, and

R_3 and R_4 are hydrogen, or

(ii)

R_2 is alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, benzyloxy, hydroxy, halogen or nitro,

R_3 is alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, benzyloxy, hydroxy or chlorine, and

R_4 is hydrogen,

(iii)

R_2, R_3 and R_4 are, independently, alkoxy of 1 to 4 carbon atoms or benzyloxy, or

(iv)

R_2, R_3 and R_4 are, independently, alkyl of 1 to 4 carbon atoms, or

(v)

R_2, R_3 and R_4 are hydroxy, with the proviso that (i) when one of the radicals R_2, R_3 and R_4 is benzyloxy, the indi-

cated radical in the 8 or 9 position of the benzonaphthyridine structure (R_1) is hydrogen or alkoxy of 1 to 4 carbon atoms, (ii) when the indicated radical in the 8 or 9 position of the benzonaphthyridine structure (R_1) is other than hydrogen or alkoxy and is in the 9 position, each of the radicals R_2, R_3 and R_4 is other than alkoxy of 1 to 4 carbon atoms, and (iii) when one of the radicals R_2 and R_3 is benzyloxy or alkoxy of 1 to 4 carbon atoms, the remaining radical R_2 or R_3 is other than hydroxy,

in free base form or in pharmaceutically acceptable acid addition salt form, in racemic form or in optically active form.

2. A pharmaceutical composition useful as a bronchospasmolytic comprising a therapeutically effective amount of a compound of claim 1 in association with a pharmaceutical carrier or diluent.

4,087,531
N-(3-(P-FLUORO-BENZOYL)-N-PROPYL)-4-(IMIDAZOLIDIN-2-ONE-1-YL)-PIPERIDINES AND SALTS THEREOF

Adolf Langbein, Ingelheim am Rhein; Gerhard Walther, Bingen, am Rhein; Peter Danneberg, Ockenheim, and Franz Josef Kuhn, Bingen, am Rhein, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

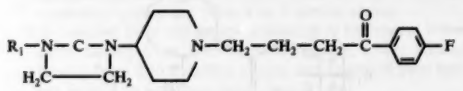
Continuation-in-part of Ser. No. 575,941, May 9, 1975, abandoned. This application Oct. 6, 1976, Ser. No. 730,123

Claims priority, application Germany, May 16, 1974, 2423896

Int. Cl.[2] C07D *401/04;* A61K *31/445*

U.S. Cl. 424—267 **6 Claims**

1. A compound of the formula



wherein R_1 is hydrogen, acetyl, alkyl of 1 to 3 carbon atoms or phenyl, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

5. A neuroleptic pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective CNS-depressing, sedative or tranquilizing amount of a compound of claim 1.

4,087,532
ANALGESICALLY USEFUL 2-TETRAHYDROFURFURYL-5-LOWER ALKYL-2-OXY-6,7-BENZOMORPHANS AND SALTS THEREOF

Herbert Merz; Adolf Langbein, both of Ingelheim am Rhein; Gerhard Walther, and Klaus Stockhaus, both of Bingen am Rhein, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation of Ser. No. 555,350, Mar. 5, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 673,116

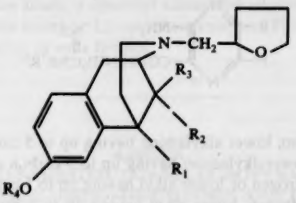
Claims priority, application Germany, Mar. 9, 1974, 2411382; Mar. 9, 1974, 2411382

The portion of the term of this patent subsequent to Sep. 21, 1993, has been disclaimed.

Int. Cl.[2] C07D *221/26;* A61K *31/445*

U.S. Cl. 424—267 **9 Claims**

1. A compound of the formula



wherein

R_1 is methyl, ethyl or propyl,

R_2 is hydrogen, methyl or ethyl,

R_3 is hydrogen or methyl, and

R_4 is hydrogen, alkyl of 1 to 4 carbon atoms or alkanoyl of 2 to 5 carbon atoms, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

9. The method of alleviating pain in a warm-blooded animal, which comprises perorally, parenterally or rectally administering to said animal an effective analgesic amount of a compound of claim 1.

4,087,533
1-(1-ACYLAMINO-2,2,3-TRICHLORO-PROPYL)-IMIDAZOLES AND 1,2,4-TRIAZOLES

Jurgen Curtze, Geisenheim-Johannisberg; Klaus Thomas, Gau-Algesheim; Walter Ost, Bingen, Rhein, and Christo Assenov Drandarewski, Ingelheim am Rhein, all of Germany, assignors to Celamerck GmbH & Co., KG, Ingelheim am Rhein, Germany

Filed Jul. 26, 1976, Ser. No. 708,883

Claims priority, application Germany, Jul. 29, 1975, 2533792; Jan. 26, 1976, 2602739

Int. Cl.[2] C07D *249/08;* A01N *9/22*

U.S. Cl. 424—269 **3 Claims**

1. 1-(1-Acetamino-2,2,3-trichloro-n-propyl)-1,2,4-triazole.

4,087,534
N-HALOALKYLMIO URAZOLE PESTICIDES

David Ovadia, 59 Hazvi Street; Nitzah Peleg, 703 Hanesiim Street, both of Beer Sheva, and Peretz Bracha, 14 Tamar Street, Omer, all of Israel

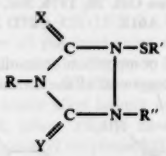
Continuation-in-part of Ser. No. 579,007, May 19, 1975, abandoned. This application Feb. 11, 1977, Ser. No. 767,884

Claims priority, application Israel, May 22, 1974, 44882

Int. Cl.[2] A01N *9/12;* A61K *31/41;* C07D *249/12*

U.S. Cl. 424—269 **15 Claims**

1. A compound having the formula



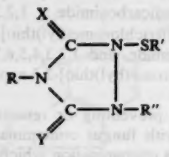
wherein R is alkyl of 1–12 carbon atoms, cycloalkyl having 3–6 carbon atoms, lower mono haloalkyl, benzyl, phenylethyl and phenyl, optionally substituted by 1–3 halogens, nitro, chloromethyl, trifluoromethyl, lower alkyl, lower alkoxy or lower alkylthio groups;

R′ is haloalkyl having 1 to 2 carbon atoms and at least 2 halogen substituents;

R″ is R or — SR′; and

X and Y are independently oxygen or sulfur.

12. A biocidal composition containing in a biologically effective amount one or more compounds of the formula:



wherein R is alkyl of 1–12 carbon atoms, cycloalkyl having 3–6 carbon atoms, lower mono haloalkyl, benzyl, phenylethyl and phenyl, optionally substituted by 1–3 halogens, nitro, chloromethyl, trifluoromethyl, lower alkyl, lower alkoxy or lower alkylthio groups;

R′ is haloalkyl having 1 to 2 carbon atoms and at least 2 halogen substituents;

R″ is R — or SR′; and

X and Y are independently oxygen or sulfur; and a solid or liquid carrier.

4,087,535

5-METHYL-ISOXAZOLE-4-CARBOXYLIC ACID ANILIDES

Günther Heubach, Kelkheim, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

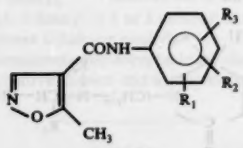
Filed Jun. 3, 1976, Ser. No. 692,306

Claims priority, application Germany, Jun. 5, 1975, 2524959

Int. Cl.² C07D *261/18;* A61K *31/42*

U.S. Cl. 424—272 **24 Claims**

1. A 5-methyl-isoxazole-4-carboxylic acid anilide of the formula



wherein

(A) R_1 and R_2 are each hydrogen and R_3 is halogen, $—CF_3$, alkoxy having 1 or 2 carbon atoms, or halo-substituted alkoxy having 1 or 2 carbon atoms;

(B) R_1 is hydrogen and R_2 and R_3, which are the same or different, are halogen or $—CF_3$;

(C) R_1 is hydrogen, R_2 is alkyl having 1 or 2 carbon atoms, and R_3 is halogen; or

(D) R_1 is hydrogen and R_2 and R_3 are 3′,4′- methylene dioxy.

7. The method of combatting pain and/or inflammation which comprises administering an effective amount of a compound as in claim 1 to a patient in need of such treatment.

4,087,536

METHOD FOR THE USE OF THIENYLVINYLIMIDAZOLES AS ANTHELMINTICS

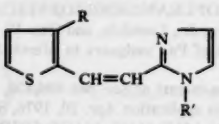
Paul B. Budde, and Robert D. Vatne, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 4, 1976, Ser. No. 683,149

Int. Cl.² C07D *409/10*

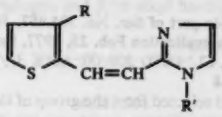
U.S. Cl. 424—273 R **15 Claims**

1. A compound corresponding to the formula



or the pharmacologically acceptable salts thereof wherein R represents hydrogen or methyl and R′ represents hydrogen, methyl, ethyl, vinyl or benzyl, with the proviso that R and R′ cannot be hydrogen at the same time.

12. A method for the control of helminthiasis in animals which comprises orally or parenterally administering to said animals an anthelmintically effective amount of a compound corresponding to the formula



or the pharmacologically acceptable salts thereof wherein R represents hydrogen or methyl and R′ represents hydrogen, methyl, ethyl, vinyl or benzyl, with the proviso that R and R′ cannot be hydrogen at the same time.

4,087,537

3-(HALOALKOXYALKYL)-CARBAMYL BENZIMIDAZOLYL CARBAMATES AND THEIR USE AS PESTICIDES

Karoly Szabo, Vienna, Austria, assignor to Syracuse University Research Corporation, Syracuse, N.Y.

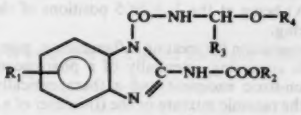
Filed Sep. 9, 1976, Ser. No. 721,906

Claims priority, application France, Sep. 17, 1975, 75 28459

Int. Cl.² C07D *235/32;* A61K *31/415*

U.S. Cl. 424—273 R **15 Claims**

1. A compound of the formula:



in which R_1 represents hydrogen or halogen, alkyl containing from 1 to 4 carbon atoms, alkoxy containing 1 to 4 carbon atoms or nitro;

R_2 represents alkyl containing from 1 to 4 carbon atoms;

R_3 represents hydrogen, alkyl or haloalkyl containing from 1 to 4 carbon atoms;

R_4 represents alkyl, haloalkyl, arylalkyl or arylhaloalkyl containing from 1 to 12 carbon atoms;

one at least of the groups R_3 and R_4 being a halogenated group.

15. A composition for preventing fungi from emitting spores, for sterilizing acaridae eggs or for use as a systemic fungicide comprising 0.5 to 95% by weight of a compound defined in claim 1 and an inert vehicle or carrier therefor.

4,087,538

OPHTHALMIC SUSPENSIONS

Joel B. Portnoff, Philadelphia, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 9, 1976, Ser. No. 721,922

Int. Cl.² A61K *31/40*

U.S. Cl. 424—274 **2 Claims**

1. An ophthalmic suspension composition comprising 10 mg./ml. of total suspension of a medicament composition comprising 1-(p-chlorobenzoyl)-2-methyl-5-methoxy-3-indolyl acetic acid; 0.375 to 1.5 mg./ml. of total suspension of a deflocculating agent comprising polyoxyethylene (20) sorbitan monooleate; 5.0 to 15.0 mg./ml. of total suspension of a flocculating agent comprising benzyl alcohol and β-phenylethyl alcohol in a 1:1 weight ratio; and water.

4,087,539

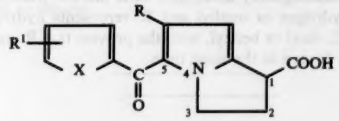
5-(2-FUROYL)-, 5-(2-THENOYL)-, 5-(3-FUROYL)- AND 5-(3-THENOYL)-1,2-DIHYDRO-3H-PYRROLO[1,2-a]PYRROLE-1-CARBOXYLIC ACID DERIVATIVES AND PROCESS FOR THE PRODUCTION THEREOF

Joseph M. Muchowski, Sunnyvale, and Arthur F. Kluge, Los Altos, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

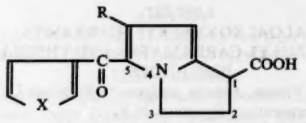
Continuation-in-part of Ser. No. 704,857, Jul. 14, 1976, abandoned. This application Feb. 23, 1977, Ser. No. 771,283
Int. Cl.[2] C07D *209/00;* A61K *31/40*
U.S. Cl. 424—274 39 Claims

1. A compound selected from the group of those represented by the formulas:

(A)



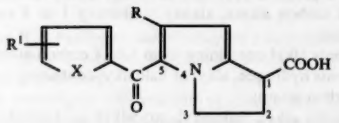
(B)



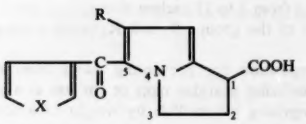
and the pharmaceutically acceptable, non-toxic alkyl esters having from one to 12 carbon atoms and salts thereof, wherein X is oxygen or sulphur, R is hydrogen or a lower alkyl group having from 1 to 4 carbon atoms and R^1 is hydrogen, methyl, chloro or bromo, the R^1 substitution in the compounds of Formula (A) being at the 3, 4 or 5 positions of the furan or thiophene ring.

33. A composition for treating inflammation, pain or pyrexia in mammals consisting essentially of a pharmaceutically acceptable non-toxic excipient and a therapeutically effective amount of the racemic mixture or the (l)-isomer of a compound represented by the formulas:

(A)



(B)



and the pharmaceutically acceptable, non-toxic alkyl esters having from one to 12 carbon atoms and salts thereof, wherein X is oxygen or sulfur, R is hydrogen or a lower alkyl group having from 1 to 4 carbon atoms and R^1 is hydrogen, methyl, chloro or bromo, the R^1 substitution in the compounds of Formula (A) being at the 3, 4, or 5 positions of the furan or thiophene ring.

4,087,540

OCTAHYDRO-N-[(TRICHLOROMETHYL)THIO]-NAPHTHALENEDICARBOXIMIDES

Wilhelm Sandermann, Donaustauf; Heinz Eggensperger, Hamburg, and Karl-Heinz Diehl, Norderstedt, all of Germany, assignors to Sterling Drug Inc., New York, N.Y.

Filed Mar. 30, 1977, Ser. No. 782,752
Int. Cl.[2] C07D *209/66;* A61K *31/40*
U.S. Cl. 424—274 12 Claims

1. A compound selected from the group consisting of 1,2,3,5,6,7,8,8*a*-octahydro-4,7-dimethyl-N-[(trichloromethyl)-thio]-1,2-naphthalenedicarboximide, 1,2,3,4,4*a*,5,6,7-octahydro-2,2-dimethyl-N-[(trichloromethyl)thio]-1,3-methanonaphthalene-5,6-dicarboximide, and 1,2,3,4,5,6,7,8-ocatahydro-5,5-dimethyl-N-[(trichloromethyl)thio]-2,3-naphthalenedicarboximide.

9. A method for preventing or retarding the deleterious effects associated with fungus contamination on a material susceptible to fungus contamination which comprises treating the material with a fungicidally effective amount of a compound selected from 1,2,3,5,6,7,8,8*a*-octahydro-4,7-dimethyl-N-[(trichloromethyl)thio]-1,2-naphthalenedicarboximide, 1,2,3,4,4*a*,5,6,7-octahydro-2,2-dimethyl-N-[(trichloromethyl)-thio]-1,3-methanonaphthalene-5,6-dicarboximide, and 1,2,3,4,5,6,7,8-octahydro-5,5-dimethyl-N-[(trichloromethyl)-thio]-2,3-naphthalenedicarboximide.

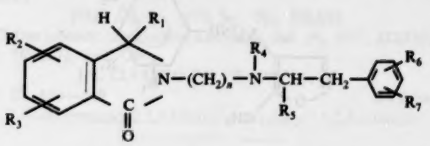
4,087,541

2-(ARALKYLAMINOALKYL)PHTHALIMIDINES

Wolfgang Eberlein; Eberhard Kutter, both of Biberach an der Riss; Joachim Heider, Warthausen; Volkhard Austel, Biberach an der Riss; Rudolf Kadatz, Biberach an der Riss; Willi Diederen, Biberach an der Riss, all of Germany; Walter Kobinger; Christian Lillie, both of Vienna, Austria, and Jürgen Dämmgen, Warthausen, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 660,841, Feb. 24, 1976, Pat. No. 4,038,407. This application May 4, 1977, Ser. No. 793,734
Int. Cl.[2] A61K *31/40;* C07D *209/46, 405/12, 491/04*
U.S. Cl. 424—274 8 Claims

1. A compound of the formula



wherein
R_1 is hydrogen, lower alkyl or phenyl,
R_2 is hydrogen, chlorine or methoxy,
R_3 is hydrogen or methoxy,
R_2 and R_3, together with each other, are methylenedioxy or ethylenedioxy,
R_4 and R_5 are each hydrogen or lower alkyl,
R_6 is hydrogen or lower alkoxy,
R_7 is lower alkoxy,
R_6 and R_7, together with each other, are methylenedioxy or ethylenedioxy, and
n is 2 or 3,
or a non-toxic, pharmacologically acceptable acid addition salt thereof.

7. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective heart rate reducing amount of a compound of claim 1.

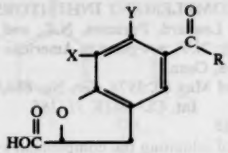
4,087,542

2,3-DIHYDRO-6,7-DISUBSTITUTED-5-ACYL BENZOFURAN-2-CARBOXYLIC ACIDS

Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 594,839, Jul. 9, 1975, abandoned. This application Apr. 20, 1976, Ser. No. 678,529
Int. Cl.[2] A61K *31/38, 31/425;* C07D *333/38*
U.S. Cl. 424—275 28 Claims

1. A compound having the formula:



wherein

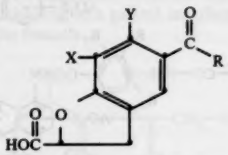
X is halo, methyl or hydrogen;

Y is halo or methyl and

R is 2-thienyl, 3-thienyl or 2 or 3 substituted thienyl wherein the substituent is halo or methyl,

a non-toxic pharmaceutically acceptable salt and a lower alkyl ester derivative thereof.

15. A pharmaceutical composition useful in the treatment of edema and hypertension comprising a therapeutically effective amount of a compound of the formula of



wherein

X is halo, methyl or hydrogen;

Y is halo or methyl;

R is 2-thienyl, 3-thienyl or 2 or 3 substituted thienyl wherein the substituent is halo or methyl,

a non-toxic pharmaceutically acceptable salt thereof or a lower alkyl ester derivative thereof and a pharmaceutically acceptable carrier.

4,087,543

COMPOSITION FOR DISINFECTING SOIL AND COMBATING PLANT DISEASES CONTAINING ORGANIC DICARBONATES

Otto Pauli; Hermann Genth, both of Krefeld, and Hermann Wolz, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

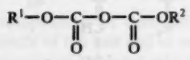
Filed Feb. 2, 1976, Ser. No. 654,671

Claims priority, application Germany, Feb. 15, 1975, 2506482

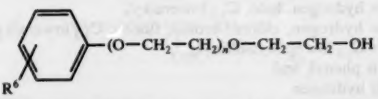
Int. Cl.[2] A01N *9/02, 9/24*

U.S. Cl. 424—301 **10 Claims**

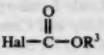
1. A composition for disinfecting soil and combating plant diseases caused by moulds, yeasts or bacteria, comprising (1) 85 to 95 percent by weight of an organic dicarbonate having the formula



wherein R^1 and R^2 are the same or different and are alkyl having up to 6 carbon atoms, cyclopentyl, cyclohexyl phenyl or benzyl, (2) 0.1 to 15 percent by weight of an alkylphenyl polyglycol ether having the formula



wherein R^6 is alkyl with 4 to 20 carbon atoms and *n* is a number from 4 to 30, and (3) 0.01 to 5.0 percent by weight of a halogenoformic acid ester of the formula



wherein Hal is halogen and R^3 is alkyl having up to 4 carbon atoms.

4,087,544

TREATMENT OF CRANIAL DYSFUNCTIONS USING NOVEL CYCLIC AMINO ACIDS

Gerhard Satzinger, Denzlingen; Johannes Hartenstein, Wittental; Manfred Herrmann, St. Peter, and Wolfgang Heldt, Wasser, all of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

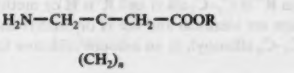
Division of Ser. No. 645,724, Dec. 31, 1975, Pat. No. 4,024,175. This application Apr. 28, 1977, Ser. No. 791,677

Claims priority, application Germany, Dec. 21, 1974, 2460891

Int. Cl.[2] A61K *31/215, 31/195*

U.S. Cl. 424—305 **11 Claims**

1. A method of treating certain forms of epilepsy, faintness attacks, hypokinesia and cranial traumas which comprises the enteral or parenteral administration to a mammal having such cranial dysfunction of an amount effective for such treatment of at least one compound or its pharmaceutically acceptable salt of the formula:



wherein R is hydrogen or a lower alkyl and *n* is 4, 5, or 6.

4,087,545

HEXAHYDRO-DIBENZO[b,d]PYRAN-9-ONES AS ANTIEMETIC DRUGS

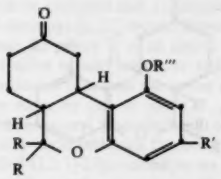
Robert A. Archer, and Louis Lemberger, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 17, 1976, Ser. No. 658,437

Int. Cl.[2] A01N *9/28;* A61K *31/35*

U.S. Cl. 424—283 **7 Claims**

1. A process for providing prevention and treatment of emesis and nausea in mammals which comprises administering to a nauseated mammal an anti-emetic dose of a compound represented by the formula



wherein R′ is either C_7–C_{10} normal alkyl or is the group

wherein R″ is C_2–C_7 alkyl and R‴ is H or methyl, wherein both R groups are identical and are H or methyl and wherein R⁗ is H or C_1–C_4 alkanoyl, in an amount effective to prevent nausea.

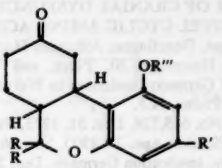
4,087,546

HEXAHYDRO-DIBENZO[b,d]PYRAN-9-ONES AS ANTIASTHMATIC DRUGS

Robert A. Archer, and Louis Lemberger, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 17, 1976, Ser. No. 658,438
Int. Cl.[2] A01N *9/28;* A61K *31/35*
U.S. Cl. 424—283 7 Claims

1. A process for providing relief from asthma in mammals which comprises administering to a mammal suffering from asthma an antiasthmatic dose of a compound represented by the formula



wherein R' is either C_7–C_{10} normal alkyl or is the group

wherein R'' is C_2–C_7 alkyl and R'is H or methyl, wherein both R groups are identical and are H or methyl and wherein R''' is H or C_1–C_4 alkanoyl, in an amount effective to relieve asthma.

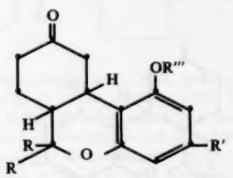
4,087,547

HEXAHYDRO-DIBENZO[b,d]PYRAN-9-ONES IN TREATMENT OF GLAUCOMA

Robert A. Archer, and Louis Lemberger, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 17, 1976, Ser. No. 658,441
Int. Cl.[2] A01N *9/28;* A61K *31/35*
U.S. Cl. 424—283 8 Claims

1. A process for reducing intraocular pressure in mammals which comprises administering to a mammal with an elevated intraocular pressure an intraocular pressure reducing dose of a compound represented by the formula



wherein R' is either C_7–C_{10} normal alkyl or is the group

wherein R'' is C_2–C_7 alkyl and R'is H or methyl, wherein both R groups are identical and are H or methyl and wherein R''' is H or C_1–C_4 alkanoyl, in an amount effective to releive intraocular pressure.

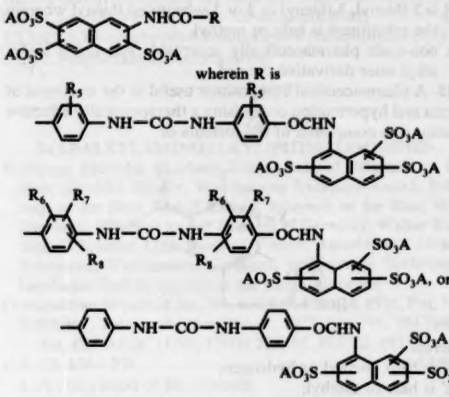
4,087,548

COMPLEMENT INHIBITORS

Robert Herman Lenhard, Paramus, N.J., and Seymour Bernstein, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 10, 1976, Ser. No. 684,599
Int. Cl.[2] A61K *31/185*
U.S. Cl. 424—315 16 Claims

1. A method of inhibiting the complement system in a body fluid which comprises subjecting said body fluid to the action of an effective complement inhibiting amount of a compound of the formula:



wherein R is

R_5, R_6, R_7 and R_8 are hydrogen or methyl; and A is hydrogen, alkali metal or alkaline earth, with the proviso that each A is identical in the same compound.

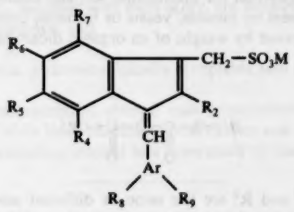
4,087,549

SULPHONIC ACID CONTAINING INDENYL DERIVATIVES

Tsung-Ying Shen, Westfield, and Howard Jones, Holmdel, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 539,377, Jan. 8, 1975, abandoned, which is a continuation-in-part of Ser. No. 312,549, Aug. 6, 1972, Pat. No. 3,860,636. This application Dec. 20, 1976, Ser. No. 752,647
Int. Cl.[2] A01N *9/00;* C07C *143/24*
U.S. Cl. 424—315 12 Claims

1. A compound of the formula:



wherein:

R_2 is hydrogen or C_{1-5} loweralkyl;

R_4, R_5, R_7, and R_8 are hydrogen;

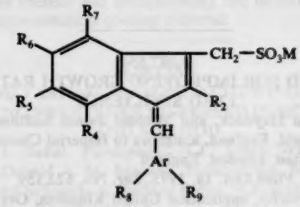
R_6 is hydrogen, halo, C_{1-5} loweralkyl,

R_9 is hydrogen, chloro, bromo, fluoro, C_{1-5} loweralkylthio, or C_{1-5} loweralkylsulfinyl;

Ar is phenyl; and

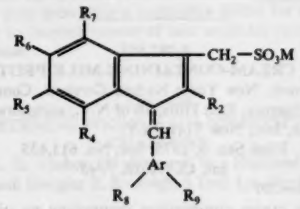
M is hydrogen.

5. A pharmaceutical composition comprising as an active ingredient 5 mg. to 3.5 grams of a compound of the formula:



wherein:
R_2 is hydrogen or C_{1-5} loweralkyl;
R_4, R_5, R_7 and R_8 are each hydrogen;
R_6 is hydrogen, halo, C_{1-5} loweralkyl;
R_9 is hydrogen, chloro, bromo, fluoro, C_{1-5} loweralkylthio, or C_{1-5} loweralkylsulfinyl;
Ar is phenyl; and
M is hydrogen.

9. A method of treating pain, fever and inflammation which comprises administering to a patient an effective amount of a compound of the formula:



wherein:
R_2 is hydrogen or C_{1-5} loweralkyl;
R_4, R_5, R_7 and R_8 are each hydrogen;
R_6 is hydrogen, halo, C_{1-5} loweralkyl,
R_9 is hydrogen, chloro, bromo, fluoro, C_{1-5} loweralkylthio, or C_{1-5} loweralkylsulfinyl;
Ar is phenyl; and
M is hydrogen.

4,087,550

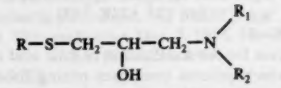
HYDROXYLATED AMINE THIOETHERS FOR IMPROVING THE GREASY AND UNAESTHETIC APPEARANCE OF THE HAIR AND SKIN

Claude Bouillon, Eaubonne, and Charles Vayssie, Aulnay-sous-Bois, both of France, assignors to L'Oreal, Paris, France

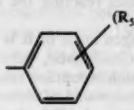
Division of Ser. No. 401,380, Sep. 27, 1973, Pat. No. 3,968,218. This application Apr. 15, 1976, Ser. No. 677,087
Claims priority, application Luxembourg, Sep. 29, 1972, 66207
Int. Cl.[2] A61K *31/165, 31/60, 31/205, 31/455, 31/195, 31/13, 31/135, 31/16*
U.S. Cl. 424—319 **12 Claims**

1. A cosmetic composition for combatting the greasy and unaesthetic appearance of the hair and to improve the appearance of the skin comprising a solvent selected from the group consisting of water, lower alkanol and an aqueous solution of said lower alkanol, and 0.1 to 20% by weight of an active compound selected from the group consisting of:

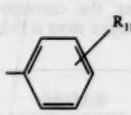
(1) a compound of the formula



wherein
R_1 and R_2 each independently are selected from the group consisting of methyl, ethyl, isopropyl, cyclohexyl, benzyl and β-hydroxyethyl, and
R is selected from the group consisting of
(i) linear or branched alkyl having 1–18 carbon atoms,
(ii) alkenyl having 3–18 carbon atoms,
(iii) alkyl having 2–3 carbon atoms and substituted by 1–2 alcohol functions,
(iv) $-(CH_2)_m-CH(OR_3)_2$ wherein R_3 is alkyl having 1–4 carbon atoms and m is 1–2,
(v) $-(CH_2)_nR_4$ wherein n is 0, 1 or 2 and R_4 is phenyl,
(vi) $-(CH_2)_qR'_4$ wherein q is 0 or 1 and R'_4 is



wherein p is 1, 2 or 3 in which instance R_5 is selected from the group consisting of F, Cl, Br, alkoxy having 1–5 carbon atoms and alkyl having 1–4 carbon atoms or wherein p is 1 in which instance R_5 is selected from the group consisting of amino and dimethylamino,
(vii) $-CH_2-CH_2-NH-Y$ wherein Y is selected from the group consisting of hydrogen and COR_9 wherein R_9 is selected from the group consisting of hydrogen, alkyl having 1–18 carbon atoms and



wherein R_{11} is selected from the group consisting of H, F, Cl, Br and alkoxy having 1–4 carbon atoms, and
(viii) $-(CH_2)_s-COOH$ wherein s is 1–10, and
(2) a salt of the compound in (1).

4,087,551

AMINO-BICYCLOHEPTANES

Peter John May, North Harrow, England, assignor to Glaxo Laboratories Limited, Greenford, England

Continuation-in-part of Ser. No. 447,867, Mar. 4, 1974, abandoned. This application Mar. 4, 1975, Ser. No. 555,147
Claims priority, application United Kingdom, Mar. 6, 1973, 10894/73; Mar. 6, 1973, 10895/73
Int. Cl.[2] A61K *31/13, 31/19;* **C07C** *87/00*
U.S. Cl. 424—325 **15 Claims**

1. A pharmaceutical composition for treating viral infections and disorders of the central nervous system comprising a pharmaceutical carrier or excipient and a therapeutically effective amount of a 7,7-dimethyl-[2,2,1]-bicycloheptane having at the 1-position a group R, where R is an amino or aminomethyl group, or a derivative of said amino or aminomethyl group wherein R is substituted at at least the amino nitrogen atom or at the 10-carbon atom by one or more C_{1-6} aliphatic, C_{3-10} cycloaliphatic, benzyl, styryl, phenylethynyl or phenyl groups; or a physiologically acceptable salt thereof.

14. 7,7-dimethyl-[2,2,1]-2-bicycloheptanes having at the 1-position a group R and the physiologically acceptable salts thereof, wherein R is an amino or aminomethyl group possessing a basic nitrogen atom and is substituted at at least the amino nitrogen atom or at the 10-carbon atom by one or more C_{1-6} aliphatic, C_{3-10} cycloaliphatic, benzyl, styryl, phenylethynyl, or phenyl groups.

15. A process for the preparation of a compound as claimed in claim **14**:
(a) wherein the R group possesses a methylene group in an alpha-position in relation to the nitrogen atom, which comprises reducing the corresponding amide;
(b) wherein R is a methylamino group, which comprises

reducing an ester of the corresponding carboxyamino compound;

(c) wherein R is a methylamino group, which comprises reductively methylating the corresponding amine;

(d) wherein the nitrogen atom of R is linked by a double bond to a C_{1-6} aliphatic, benzyl, styryl, phenylethynyl, which comprises condensing the corresponding amine with an aldehyde or ketone;

(e) wherein R is an aminomethyl group in which one of the hydrogen atoms on the methyl carbon atom is substituted, which comprises reducing the corresponding ketoxamine;

(f) wherein the nitrogen atom of R bears an phenyl substituent, which comprises reacting the corresponding amine with a benzyne;

(g) wherein the nitrogen atom of R is substituted by a C_{1-6} aliphatic, C_{3-10} cycloaliphatic, benzyl, styryl or phenylethynyl group, which comprises reacting the corresponding amine with a compound of formula R^5X where R^5 is a C_{1-6} aliphatic, C_{3-10} cycloaliphatic, or benzyl, styryl or phenylethynyl group, and X is a readily eliminatable group;

(h) where R is an aminomethyl group in which the methyl group is substituted, which comprises reducing the corresponding substituted nitromethyl compound;

(i) wherein the nitrogen atom of R is substituted by an aminoacyl group which comprises reacting a corresponding haloacyl compound with ammonia or an amine; or

(j) wherein the nitrogen atom of R is substituted by C_{1-6} aliphatic or benzyl, styryl or phenylethynyl group, which comprises reducing the corresponding compound in which the said nitrogen atom is linked to said group by a double bond.

4,087,552

INTERFERON INDUCTION IN ANIMALS BY AMINES

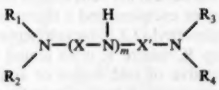
Timothy H. Cronin, Niantic; Hermann Faubl, Groton; William W. Hoffman, Mystic, and James J. Korst, Old Lyme, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 541,240, Jan. 15, 1975, abandoned, which is a division of Ser. No. 330,042, Feb. 6, 1973, Pat. No. 3,872,171, which is a continuation-in-part of Ser. No. 146,548, May 24, 1971, abandoned, which is a continuation-in-part of Ser. No. 62,192, Aug. 7, 1970, abandoned. This application May 18, 1976, Ser. No. 687,514

Int. Cl.[2] A61K *31/135, 31/205, 31/495*

U.S. Cl. 424—330 **4 Claims**

1. A process for combating viral infections in vertebrate animals which comprises parenterally, intranasally, or topically administering to the animals an antivirally effective amount of a composition containing as the essential active ingredient a compound selected from the group consisting of those having the formula



and the non-toxic acid addition salts thereof wherein

R_1 and R_2 are each alkyl of from 12 to 18 carbon atoms;

R_3 and R_4 are each hydrogen;

X′ is phenylenedimethylene; and

m is 0.

4,087,553

FUNGICIDAL 2,6-DINITRODIPHENYLTHIOETHERS

Louis Schneider, Elizabeth, and David E. Graham, Westfield, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Nov. 19, 1976, Ser. No. 743,278

Int. Cl.[2] A01N *9/12;* **C07C** *149/34*

U.S. Cl. 424—337 **10 Claims**

1. 3-Chloro-4-trifluoromethyl-2,6-dinitrodiphenylthioether.

6. A method of controlling undesired fungi comprising applying thereto a fungicidally effective amount of a compound of claim 1.

4,087,554

METHOD FOR IMPROVING GROWTH RATE AND FEED EFFICIENCY

David Bryan Haydock, and Michael James Smithers, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Oct. 14, 1975, Ser. No. 622,159

Claims priority, application United Kingdom, Oct. 30, 1974, 46967/74; May 5, 1975, 18713/75

Int. Cl.[2] A61K *31/03, 31/085, 31/19*

U.S. Cl. 424—353 **5 Claims**

1. A method for increasing the growth rate and feed efficiency of meat-producing non-ruminant animals which comprises orally administering to said meat-producing, non-ruminant animals, an effective amount of an iodonium salt of the formula $R^1R^2I^+ . X^-$ wherein R^1 and R^2 which may be the same or different, are each phenyl or phenyl bearing one or more substituents selected from nitro, hydroxy, carboxy, halogen, alkyl, alkoxy and alkanoylamino each of up to 6 carbon atoms, cycloalkyl of 3 to 7 carbon atoms, and X^- is physiologically acceptable anion.

4,087,555

SKIN CREAM CONTAINING MILK PROTEIN

Gabriel Barnett, New York; Nathan Gershaw, Commack, and Jack J. Mausner, East Hills, all of N.Y., assignors to Helena Rubinstein, Inc., New York, N.Y.

Filed Sep. 8, 1975, Ser. No. 611,435

Int. Cl.[2] A61K *7/48*

U.S. Cl. 424—357 **5 Claims**

1. A skin cream composition comprising an oil phase, a water phase, and an encapsulated active base;

(A) said oil phase comprising, in parts by weight, 1.5–3.5 parts of an emulsifier, 1.25–2.5 parts of an emollient, 8.0–14.0 parts of a lubricant, 0.5–4.0 parts of a dispersing agent, and 0.3–2.0 parts of a non-ionic surfactant;

(B) said water phase comprising, in parts by weight of up to about 5 parts of hectorite clay, 0.2–1.0 parts of a peptizer for said clay, up to 5.0 parts of a humectant, 1.2 parts of milk protein and the balance water; and

(C) said encapsulated active base comprising, in parts by weight, 0.45–1.8 parts of hectorite clay, 0.05–2.0 parts of a polar group affording organic compound (1) characterized as being reactable with said hectorite clay to form water-insoluble particles having a size above colloidal dimensions when added to an aqueous colloidal solution of synthetic hectorite clay and tetrasodium pyrophosphate and (2) selected from the group consisting of a simple organic compound having at least one polar group characterized by insubstantial solubility in water at ordinary temperatures and (3) and organic hydrophilic colloid, 0.2–1 parts of a peptizer for said clay and the balance water.

4,087,556

FOLIC ACID ANIMAL FEED MATERIALS AND PROCESSES

Kevin Michael Harte, Portlaoise, Ireland, assignor to Chemische Industrie Randstad, N.V., Curacao, Netherlands Antilles

Filed Dec. 22, 1976, Ser. No. 753,431

Int. Cl.[2] A23K *3/00*

U.S. Cl. 426—2 **12 Claims**

1. A process for the stabilization of folic acid in animal feed materials which process comprises mixing folic acid with a protective agent which is a mixture of monocalcium phosphate and citric acid, a mixture of trisodium citrate and ascorbic acid, potassium dihydrogen orthophosphate, alkali metal ascorbates,

or mixtures thereof and encapsulating the mixture in a non-toxic moisture-resistant coating material.

4,087,557

LONG-LASTING FLAVORED CHEWING GUM INCLUDING SWEETENER DISPERSED IN ESTER GUMS AND METHOD

Abraham I. Bakal, Parsippany, N.J.; Frank Witzel, Spring Valley; Donald A. M. Mackay, Pleasantville, both of N.Y., and Daniel Schoenholz, Basking Ridge, N.J., assignors to Life Savers, Inc., New York, N.Y.

Filed Sep. 29, 1976, Ser. No. 727,837
Int. Cl.[2] A23G *3/30*
U.S. Cl. 426—3 **19 Claims**

1. A flavored chewing gum having a prolonged sweet taste comprising gum base, and an ester gum, and from about 0.02 to about 15% by weight of artificial sweetener, based on the weight of the gum base component, interdispersed in the gum base, said chewing gum being prepared by the process which comprises the steps of incorporating the artificial sweetener in the ester gum prior to incorporating the ester gum in the gum base, combining the resulting combination with gum base ingredients to form a gum base, and mixing the gum base with one or more flavors and sweeteners to form a chewing gum, said ester gum providing a protective shield for the artificial sweetener to control release of said artificial sweetener from the gum base.

4,087,558

SWEETENING FOODS WITH NEOHESPERIDIN CHALCONE

Harald A. B. Linke, 138 Barnard St., Highland Park, N.J. 08904, and Douglas E. Eveleigh, 1 Toth La., Rocky Hill, N.J. 08553

Filed Mar. 16, 1976, Ser. No. 667,367
Int. Cl.[2] A23G *3/30, 9/00;* **A23L** *1/22*
U.S. Cl. 426—3 **1 Claim**

1. The method of sweetening foods, which comprises incorporating neohesperidin chalcone as a sucrose substitute in a food selected from the group consisting of beverages, candy, or chewing gum, in an amount to achieve the desired sweetness level.

4,087,559

FERMENTED MILK CONTAINING VIABLE BIFIDOBACTERIA

Masahiko Mutai, Higashi Yamato; Mitsuo Mada, Kodaira; Kei Nakajima, Fuchu; Kiyohiro Shimada, and Takashi Iijima, both of Kunitachi, all of Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed Oct. 26, 1976, Ser. No. 735,412
Claims priority, application Japan, Jan. 1, 1976, 51-295
Int. Cl.[2] A23C *9/12*
U.S. Cl. 426—43 **1 Claim**

1. A method for producing fermented milk containing viable bifidobacteria, which comprises cultivating *Bifidobacterium bifidum* YIT-4002 in a medium consisting of whole milk, skim milk or reconstituted milk.

4,087,560

KETCHUP SUBSTITUTE AND PROCESS FOR MAKING THE SAME

Alden K. Yao, and James L. Segmiller, both of Pittsburgh, Pa., assignors to H. J. Heinz Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 573,007, Apr. 30, 1975, abandoned. This application Dec. 7, 1976, Ser. No. 748,314
Int. Cl.[2] A23L *1/24*
U.S. Cl. 426—250 **2 Claims**

1. A process for the preparation of an edible food product having substantially the characteristics of tomato ketchup and free from any objectionable flavor consisting essentially of:

(a) preparing a starch slurry by mixing starch in water in about the proportions of 10 ounces of starch to about 3 pounds of water;

(b) preparing a pre-batch of carrots by first peeling, chopping and dicing 10 to 50 pounds of raw carrots and then boiling said carrots in water;

(c) combining the boiled carrots thus obtained with 2 – 5% by weight salt, 8 – 18% by weight seasoning agents, 5 – 25% by weight vinegar, 10 – 30% by weight sweeteners, 0.1 – 0.5% by weight artificial colorings, 5 – 25% by weight tomato paste and sufficient water to bring to a volume of 10 gallons;

(d) agitating the mixture thus obtained;

(e) heating said mixture to about 160° F;

(f) pulping said mixture by hammer mill followed by a finisher so as to adjust the particle size of the carrots to within the range of from about 5 to about 400 microns, 90 percent of the carrot solids having a particle size between about 10 and 130 microns;

(g) adding said starch slurry to said mixture in about the proportions of 3 pounds starch slurry to about 10 gallons of said mixture with agitation;

(h) adjusting the temperature of said mixture to about 180° – 210° F; and

(i) deaerating said mixture, whereby said edible product is produced.

4,087,561

CONTROL OF NITROSAMINE FORMATION IN NITRITE CURED MEAT WITH 1,2,3,4-TETRAHYDRO-QUINOLINE COMPOUNDS

Kekhusroo R. Bharucha, Toronto, Canada, and Michael H. Coleman, Putnoe, England, assignors to Canada Packers Limited, Toronto, Canada and Unilever Limited, London, England

Filed Dec. 22, 1975, Ser. No. 643,558
Int. Cl.[2] A23B *4/02*
U.S. Cl. 426—266 **24 Claims**

1. A meat treating composition comprising a solution or dispersion of a 1,2,3,4-tetrahydro-6-alkoxyquinoline compound, wherein the alkoxy group contains from 1 to 12 carbon atoms, in a nitrite-containing meat curing solution, the amount of said compound in said composition being effective to reduce the formation of nitrosamines in nitrite cured meat treated by said composition and cooked at frying temperature.

4,087,562

DECAFFEINATION OF GREEN COFFEE

Gary Victor Jones, Ramsey, N.J., and Joseph Francis Coogan, III, Millbrook, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Sep. 18, 1975, Ser. No. 614,398
Int. Cl.[2] A23F *1/10, 3/02*
U.S. Cl. 426—428 **2 Claims**

1. A method for decaffeinating green coffee comprising the steps of:

a. moistening the green coffee,

b. contacting the moistened green coffee with diethyl succinate for a sufficient period of time to remove caffeine from the coffee,

c. removing residual diethyl succinate from the green coffee, and

d. roasting the decaffeinated green coffee.

4,087,563

METHOD FOR PROCESSING FISHES

Tadashi Sekiguchi, Shizuoka, Japan, assignor to Hotei Kanzume Co., Ltd., Japan

Filed Jun. 21, 1976, Ser. No. 698,303

Claims priority, application Japan, Jun. 20, 1975, 50-75021; Jun. 20, 1975, 50-75022; Jun. 20, 1975, 50-75023

Int. Cl.[2] A22C *25/00*

U.S. Cl. 426—479 6 Claims

1. A method for processing a fish body which comprises the steps of:

(a) separating the head parts and the internal organs therefrom to obtain a dressed fish body,

(b) slicing the dressed fish body longitudinally to separate the dressed fish body into three parts comprising upper and lower fish meat fillets and a central part containing vertebra,

(c) heating the fillets by juxtaposing them on a plain plate with their skins lowermost and in contact with the underlying plate and then subjecting the so positioned fillets to a flow of steam or to hot water at a temperature of 80°–100° C. for 20–30 minutes,

(d) forcibly cooling the resultant fillets heated by step (c).

4. A method for processing a fish body which comprises the steps of:

(a) separating head parts and internal organs of the fish body therefrom to obtain a dressed fish body,

(b) slicing the dressed fish body longitudinally to divide the fish body into three parts including a central part containing vertebra and fish fillets on both sides of said central part,

(c) heating the central part containing the vertebra in a flow of steam or in hot water at a temperature of 80°–100° C. for 20–30 minutes,

(d) forcibly cooling the central part heated by step (c),

(e) separating from the central part bones to which white meats are adhering, and

(f) stirring a mixture of the bones having white meats adhering thereto separated by step (e) and water to remove the white meat from the bones and then collecting the removed white meat.

4,087,564

FRACTIONATED CO-RANDOMIZED FAT BLEND AND USE

Cornelis Poot; Charles Cornelis Verburg, both of Vlaardingen, Netherlands; Douglas Chater Kirton, Grays, and Avril Brown MacNeill, Gravesend, both of England, assignors to Lever Brothers Company, New York, N.Y.

Filed Mar. 2, 1976, Ser. No. 663,021

Claims priority, application United Kingdom, Mar. 4, 1975, 8938/75

Int. Cl.[2] A23D *3/00*

U.S. Cl. 426—603 18 Claims

1. Fat product consisting essentially of:

A. up to 30% of non-randomized fats, and

B. an olein fraction of a co-randomized fat blend of:

(i) a fat having a palmitic acid content of 35% or more, and

(ii) a vegetable fat containing at least 80% of fatty acids with a chain length of 18 carbon atoms or more, at least part of which fatty acids are all cis-unsaturated fatty acids with a chain length of 18 carbon atoms, in such a weight ratio of fats (i) and (ii) that the fat product contains:

30 to 46% of palmitic acid residues,

42 to 62% of cis-mono and all-trans-poly-unsaturated fatty acid residues, with a chain length of 18 carbon atoms,

up to 15% of saturated fatty acid residues with a chain length of 14 carbon atoms or less, and

up to 5% of triglycerides of saturated fatty acids with a chain length of 16 carbon atoms or more.

4,087,565

METHOD FOR IMPROVING THE STRUCTURAL PROPERTIES OF FATS

Hermanus Johannes Gerardus Ebskamp, 7, 2e Industrieweg, Lopik, Netherlands

Continuation of Ser. No. 570,888, Apr. 23, 1975, abandoned, which is a continuation of Ser. No. 353,814, Apr. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 70,997, Sep. 10, 1970, abandoned. This application Apr. 29, 1976, Ser. No. 681,702

Claims priority, application Netherlands, Sep. 11, 1969, 6913846, Feb. 17, 1970, 7002216

Int. Cl.[2] A23D *3/02*

U.S. Cl. 426—603 9 Claims

1. A process for producing margarine, which consists essentially of the steps of:

feeding into a first zone a water-in-oil emulsion wherein the oil phase is a molten fat mixture consisting essentially of

(a) from 2 to 5 percent by weight of hardened animal or vegetable fat having a melting point of over 60° C,

(b) from 8 to 11 percent by weight of hardened animal or vegetable fat having a melting point in the range of from 35° to 55° C, and

(c) the balance is liquid oil containing polyunsaturated fatty acids in an amount such that the fat phase of the margarine product contains at least 50 percent by weight of polyunsaturated fatty acids, said liquid oil being not crystallizable at 10° C,

and in said first zone cooling said emulsion to a first temperature of between 20° C, as a lower limit, and at least 10° C below the melting point of the fat in said emulsion, as an upper limit, and simultaneously agitating the emulsion in the first zone, whereby to remove from 10 to 40% of the total latent heat of crystallization of the fat components of the emulsion which crystallize at a temperature of above 10° C,

then discontinuing cooling of said emulsion after it has reached said first temperature and feeding said emulsion into a second non-cooled zone and therein subjecting said emulsion to mechanical working and agitation, without cooling said emulsion, to cause the temperature of said emulsion to rise from 2° to 8° C,

then after said emulsion has reached said second temperature, feeding said emulsion into a third cooled zone and therein cooling said emulsion to a temperature below 20° C while continuing to agitate said emulsion.

4,087,566

FIBROUS PROTEIN MATERIALS

Myung Ki Kim, Congers, and Joaquin Castro Lugay, Thornwood, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation-in-part of Ser. No. 480,987, Jun. 18, 1974, Pat. No. 4,001,459. This application Apr. 6, 1976, Ser. No. 674,193

The portion of the term of this patent subsequent to Jan. 4, 1994, has been disclaimed.

Int. Cl.[2] A23J *3/00*

U.S. Cl. 426—656 8 Claims

1. A method for preparing a texturized protein material comprising:

(a) preparing a solution comprising heat coagulable protein

and water, wherein the protein is dissolved in the water and the solution pH is at the point of maximum protein solubility;

(b) cooling the solution to freeze the water into elongated ice crystals and to separate the protein into well-defined, well-ordered, substantially independent zones;

(c) immersing the resulting frozen mass into an aqueous stabilizing solution for a time effective to stabilize the protein in the frozen mass to prevent excessive bonding during subsequent heating, wherein the aqueous stabilizing solution comprises an edible, water-soluble material capable of lowering the freezing point of water, decreasing the hydrophillic potential of the protein causing conformational changes in the protein, decreasing water availability to the protein, lowering the surface tension of the water, and stabilizing the protein; and

(d) heating the resulting stabilized material to coagulate the protein.

4,087,567

ANTICOAGULANT COATING METHOD

Kevin J. Sullivan, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 679,166, Apr. 22, 1976. This application Jun. 10, 1977, Ser. No. 805,323

Int. Cl.[2] A01N *1/02*; A61K *7/04*

U.S. Cl. 427—2 **3 Claims**

1. A method of coating the interior surface of a capillary blood sample tube comprising

dispensing a quantity of an anticoagulant solution into the interior of said tube sufficient to coat the interior surface thereof, said solution comprising a filler and a solvent, said filler consists essentially of from about 10 percent to about 95 percent by weight of a salt of ethylene diamine tetracetate and from 5 to about 90% by weight of polyvinyl pyrrolidone,

applying said solution to said interior surface by capillary action, and

volatilizing said solvent.

4,087,568

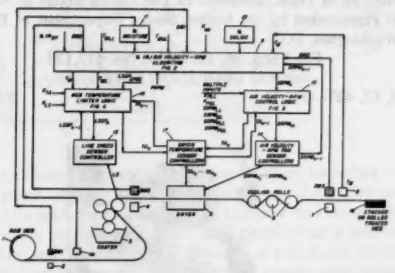
METHOD AND APPARATUS FOR CONTROLLING A MATERIAL TREATER AT MAXIMUM THROUGHPUT WITH AIR VELOCITY CONTROL

Charles Robert Fay, Bridgewater, N.J., and Raymond Joseph Williams, Fair Oaks, Calif., assignors to Formica Corporation, Cincinnati, Ohio

Filed Jul. 1, 1977, Ser. No. 812,191

Int. Cl.[2] B05C *3/12*; B05D *1/18*

U.S. Cl. 427—8 **6 Claims**



1. A method of controlling the drying of a fibrous host material which has been treated with a resinous solution in a dryer which comprises:

1. measuring the weight of said host material before treating and providing a signal (A) representative of said weight before treating,

2. measuring the weight of the treated material before drying and providing a signal (B) representative of said weight before drying,

3. measuring the weight of the dried, treated material and providing a signal (C) representative of said weight after drying,

4. providing a signal (D) representative of the resin solids fraction of said resinous solution,

5. determining the actual percent volatiles of said dried, treated material from said signals (A), (B), (C) and (D) and providing a signal (E) representative of said percent volatiles,

6. providing a signal (F) representative of the specification percent volatiles of said dried, treated material,

7. determining the variation between said signals (E) and (F) and providing a signal (G) representative of said variation,

8. providing a signal (H) representative of the velocity of the air impinging upon said host material in said dryer,

9. calculating the desired velocity of air in said dryer from said signals (G) and (H) and providing a signal (I) representative of said desired velocity of air,

10. measuring the temperature of said dried, treated material after it exits the drier and providing a signal (J) representative of said temperature,

11. providing a signal (K) representative of the upper limit of the temperature of said dried, treated material and a signal (L) representative of the lower limit of the temperature of said dried, treated material,

12. determining whether said signal (J) falls within the limits represented by said signals (K) and (L) and providing a signal (M) representative of the upper or lower limit exceeded if said signal (J) does not fall within said limits,

13. providing a signal (N) representative of the line speed set point of said host material,

14. providing a signal (O) representative of the maximum allowable line speed set point of said host material,

15. calculating the new line speed set point of said host material from said signals (J) , (M), (N) and (O) and providing a signal (P) representative of said new line speed set point,

16. providing a signal (Q) representative of the temperature of the air in said dryer,

17. calculating the new temperature set point of the air in said dryer from said signals (J), (M) and (Q) and providing a signal (R) representative of said new temperature set point,

18. providing a signal (S) representative of the preliminary lower limit of the air velocity in said dryer,

19. providing a signal (T) representative of the preliminary upper limit of the air velocity in said dryer,

20. providing a signal (U) representative of the lower limit of the air velocity in said dryer,

21. providing a signal (V) representative of the upper limit of the air velocity in said dryer,

22. calculating the new air velocity set point from signals (I), (S), (T), (U) and (V) and providing a signal (W) representative of said new air velocity set point,

23. calculating the new temperature set point of the air in said dryer from said signals (I), (S), (T) and (Q) and providing a signal (R^1) representative of said new air temperature set point,

24. controlling the line speed of said host material in conformity with said signal P,

25. controlling the velocity of the air in said dryer in conformity with said signal W and

26. controlling the temperature of the air in said dryer in conformity with either signal (R) or signal (R^1).

4,087,569

PREBAKING TREATMENT FOR RESIST MASK COMPOSITION AND MASK MAKING PROCESS USING SAME

Michael Hatzakis, Ossining, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,949
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—43 7 Claims

1. A method for the production of a resist image comprising the steps of:

prebaking a dry powder of a radiation-sensitive polymeric material comprising polymethyl methacrylate/methacrylic acid copolymer at a first temperature below the decomposition temperature,

adding a solvent for said polymeric material to the yield of said prebaking step to produce a solution of said polymeric material and an insoluble residue,

then separating said solution from said residue and retaining said solution,

coating only said solution of polymeric material without said residue upon a substrate to form a thin polymeric film of said polymeric material,

post-baking said substrate and said polymeric film at a second temperature less than or equal to said first temperature and above the evaporation point of said solvent for a predetermined time required for drying said polymeric ffilm at said second temperature,

exposing said polymeric film to radiation in a predetermined pattern, and

developing said polymeric film.

4,087,570

METHOD OF MAKING MEDALLION-LIKE ARTICLES AND LENSES

Richard E. Beinbrech, Westerville, Ohio, assignor to Murfin Incorporated, Columbus, Ohio

Continuation of Ser. No. 599,861, Jul. 28, 1975, abandoned. This application Mar. 16, 1977, Ser. No. 777,952
Int. Cl.[2] B29C *7/00;* B29D *9/00*
U.S. Cl. 427—44 5 Claims

1. A method for fabricating a medallion without upward curl of its edges during cure, said method comprising:

(a) depositing a liquid polymer which is curable by radiation other than radiant heat upon a discontinuous, flexible, substantially unrestrained substrate to form an uncured medallion having a rounded, meniscus-shaped top surface;

(b) cooling the surface upon which said uncured medallion is supported during curing to a temperature below substantially 60° F; and

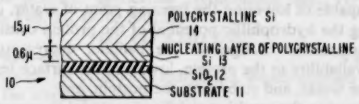
(c) curing said polymer by exposing it to said radiation while supported on said cooled surface.

4,087,571

CONTROLLED TEMPERATURE POLYCRYSTALLINE SILICON NUCLEATION

Theodore I. Kamins, Mountain View, and Juliana Manoliu, Palo Alto, both of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Continuation of Ser. No. 147,912, May 28, 1971, abandoned. This application Jun. 24, 1975, Ser. No. 589,821
Int. Cl.[2] H01L *21/205*
U.S. Cl. 427—86 3 Claims



1. The method of forming a polycrystalline silicon layer upon a substrate which comprises:

forming a nucleating layer of polycrystalline silicon on said substrate at a temperature in the range of about 750° C to 800° C such that said nucleating layer possesses a substantially maximum [110] texture; and

forming a second polycrystalline silicon layer on said nucleating layer at a second, higher temperature suitable for the simultaneous formation of polycrystalline silicon on said nucleating layer and, epitaxially, single crystal silicon upon said substrate.

4,087,572

METHOD OF PREVENTING ENVIRONMENTAL EROSION

Kenneth H. Nimerick, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 306,998, Nov. 16, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 427,609
Int. Cl.[2] B05D *7/00, 1/36*
U.S. Cl. 427—214 13 Claims

1. A method for treating the surface of a pile or mass of finely divided particulate matter which comprises: applying to said surface in synergistic combination an amount of a film forming organic polymer sufficient to penetrate said surface to form a water-wettable supporting crust and an amount of a silicone sufficient to form a hydrophobic coating on said crust.

4,087,573

ADHESIVE PLASTERS

Cressie E. Holcombe, Jr., Knoxville; Ronald L. Swain, Concord; John G. Banker, Kingston, and Charlene C. Edwards, Knoxville, all of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 26, 1975, Ser. No. 617,126
Int. Cl.[2] C04B *35/50;* C09K *3/00*
U.S. Cl. 427—372 R 5 Claims

1. A spontaneously hardening composition of matter com-

prising a suspension of an oxide powder selected from the group of Y_2O_3, Eu_2O_3, Gd_2O_3 and Nd_2O_3 in a solution of 0.5-6M acid, said acid selected from the group of HNO_3, HCl, HBr, HI, and $HClO_3$.

4,087,574

METHOD OF SUBBING PLASTIC FILMS

June Yamaguchi; Nobuo Tsuji; Takenori Omichi, and Teruo Yamaguchi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 19, 1976, Ser. No. 687,818
Claims priority, application Japan, May 19, 1975, 50-59475
Int. Cl.[2] B05D *1/36;* B32B *27/08, 9/04*
U.S. Cl. 427—407 F 16 Claims

1. A method of subbing a photographic support having a polyester surface comprising applying to said polyester surface an aqueous subbing composition containing an aqueous dispersion of a polymer of (1) 45 to 99.5% by weight of at least one monomer selected from the group consisting of vinylidene chloride and vinyl chloride; (2) 0.1 to 15% by weight of at least one monomer selected from vinyl monomers having one or more alcohol groups in their side chains; and (3) 0 to 54.4% by weight of at least one monomer selected from the group consisting of acrylates, methacrylates, acrylonitrile, methacrylonitrile, alkyl vinyl esters and alkyl vinyl ethers.

4,087,575

LIQUID CRYSTAL FILM

Kamal F. Bichara, 911 S. Gordon Sq., Bolivar, Ohio 44612

Continuation-in-part of Ser. No. 515,088, Oct. 16, 1974, abandoned. This application Aug. 23, 1976, Ser. No. 716,430
Int. Cl.[2] C09K *3/34;* A61B *5/00;* B05D *3/02*
U.S. Cl. 428—1 14 Claims

1. A color-changing liquid crystal product in self-supporting elastomeric thin film form, comprising cholesteric liquid crystal esters dispersed in direct contact with a matrix of a thermoplastic chemically neutral elastomer in the form of a thin film.

4,087,576

GREETING CARD AND ORNAMENT

Michael P. Patterson, 11701 West River Hill Dr. No. 206, Burnsville, Minn. 55337

Filed May 12, 1976, Ser. No. 685,820
Int. Cl.[2] B65D *65/28*
U.S. Cl. 428—8 3 Claims

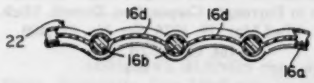
1. An ornament greeting card combination, including a first card panel carrying a greeting, second and third card panels joined to each other along a fold line and said second being detachably secured to the first card panel along a perforated tear line and foldable relative thereto, a punch-out ornament included on the second and third card panels, said ornament comprising a winged body represented by two mirror image initially flat side panels, one side panel formed in each of said second and third card panels and said side panels being joined to each other along said fold line which defines one edge of said ornament, said flat side panels each including a body section and a wing section, a separate second fold line between each body section and its attached wing section, and a separate tab defined adjacent each of said second fold lines and being formed by slit lines to permit punching out the separate tab from each wing section which remains attached to the respective body section along the respective second fold line, so that the tabs thereby protrude from each of the wing sections, said tabs being positioned contiguous to each other when the ornament is assembled, and including means to tie a string to both of the tabs to hold the tabs together and thereby to hold adjacent edges of the body sections together and suspend the ornament, said wing sections being foldable outwardly from the tabs and the respective body sections along said second fold lines to extend in opposite directions from the body sections and wherein one side panel of the ornament includes means to provide a sender's signature carried by the ornament when assembled and on a surface readable when the first panel of the folded card is opened before the ornament is punched out.

4,087,577

SCRIM REINFORCED PLASTIC FILM

Thomas C. Hendrickson, South River, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Dec. 2, 1976, Ser. No. 746,915
Int. Cl.[2] B32B *5/12*
U.S. Cl. 428—110 6 Claims



1. A reinforced plastic sheet material comprising a scrim which includes two sets of angularly disposed strands that intersect at points of intersection each set comprising a plurality of uniformly spaced strands, and a continuous film of plastic material covering both sides of said strands and extending between said strands, said plastic material completely enclosing and surrounding said scrim said plastic material having substantially greater heat shrinking properties than said scrim to result in a plurality of said strands being buckled between the points of intersection of said intersecting strands and providing said material with a rough, nubby surface that is both visually and tactilely discernible.

4,087,578

HEAT SEALABLE SHEET MATERIALS

Eckart Reese, Dormagen-Hackenbroich, and Joachim Wank, Zons, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 468,801, May 10, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,723
Claims priority, application Germany, May 16, 1973, 2324715
Int. Cl.[2] C09J *7/02*
U.S. Cl. 428—216 4 Claims

1. A heat sealable sheet material comprising a hydantoin sheet having a coating firmly bonded thereto, said coating consisting essentially of a partially fluorinated high molecular weight aliphatic hydrocarbon having a molecular weight of 1,000 to 500,000.

4,087,579

PRESSURE-SENSITIVE TRANSFER ELEMENTS

Douglas A. Newman, Glen Cove, N.Y., assignor to Columbia Ribbon & Carbon Mfg. Co., Inc., Glen Cove, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,718
The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.
Int. Cl.[2] B32B *7/02*
U.S. Cl. 428—216 7 Claims

1. A pressure-sensitive transfer element comprising a composite plastic film foundation carrying a solidified layer comprising pressure-transferable imaging material which is transferable from said foundation to a copy sheet under the effects

of typing pressure, said composite foundation comprising a laminate of two different extruded plastic films, each having a maximum caliper of about 1 mil, one said film being a tensilized, asymmetrically-oriented polyethylene terephthalate polyester film having a tensile strength (MD) greater than about 31,000 psi, a % elongation (MD) of less than about 60 and relatively low deformability and low embossment retention under the effects of typing pressure and the other of said films being nylon having a tensile strength (MD) below about 26,000 and a % elongation (MD) greater than about 100, said nylon film deforming to a greater degree about a type face under the effects of typing pressure and having a higher embossment retention than said polyester film, said films being bonded together by means of a thin adhesive intermediate layer to form a laminate having greater resistance to cracking, breaking and fracturing under the effects of typing pressure than the said polyester film and greater strength and resistance to retained embossing than the said nylon film.

4,087,580

WATER EXTENDED PLASTISOL FILM CARBON PAPER

Michael Jerry McElligott; John Lewis Williams, both of Rochester, and Russell William Gauger, Jr., Henrietta, all of N.Y., assignors to Burroughs Corporation, Detroit, Mich.

Filed Mar. 29, 1976, Ser. No. 671,400
Int. Cl.² B32B *3/26*
U.S. Cl. 428—307 **5 Claims**

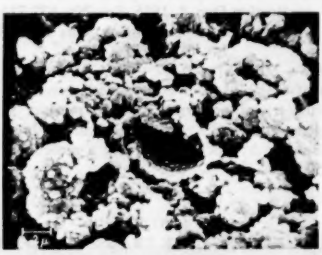
1. In an ink releasing member of the plastisol type having a matrix in which a liquid ink is suspended within the pores thereof and expressed therefrom upon impact of a pressure producing device, the improvement wherein a plastisol is formed of dispersion grade polyvinyl chloride mixed with water soluble plasticizer before fusion, the said water soluble plasticizer being selected from a group consisting of ether alcohol and polyether alcohols and glycerin, or mixtures thereof.

4,087,581

OPACIFYING SUPER-PARTICLES

David N. Vincent, Glenview, and Ronald Golden, Mt. Prospect, both of Ill., assignors to Champion International Corporation, Stamford, Conn.

Division of Ser. No. 508,322, Sep. 23, 1974. This application Aug. 24, 1976, Ser. No. 717,449
Int. Cl.² B32B *5/16, 1/00*
U.S. Cl. 428—327 **8 Claims**



1. An opacified substrate, said substrate having a surface coating thereon, said coating consisting essentially of opacifying agents, said opacifying agents consisting essentially of substantially spherical superparticles, each of said super-particles having a substantially spherical, discontinuous shell composed of agglomerated, discrete, organic, polymeric secondary particles, said shell surrounding a substantially spherical hollow core, said secondary particles being substantially spherical and substantially solid throughout.

4,087,582

MAGNETIC RECORDING MEDIUM

Ryuji Shirahata, and Tatsuji Kitamoto, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 4, 1974, Ser. No. 520,816
Claims priority, application Japan, Nov. 2, 1973, 48-123611
Int. Cl.² H01F *10/00;* G11B *5/72*
U.S. Cl. 428—333 **6 Claims**

1. A magnetic recording medium comprising a support, a magnetic recording layer from about .05 μm to 2 μm thick comprising a thin film of a ferromagnetic metal on said support, and one to about 100 monomolecular layers of a linear saturated fatty acid containing about 8 to 28 carbon atoms or a metal salt thereof on the outer surface of said magnetic recording layer, each of said one to about 100 monomolecular layers having a thickness of about 15 A to 30 A.

4,087,583

PREPARING MANGANESE OXIDE COATED ACRYLIC FIBER AND ARTICLE THEREFROM

Willard S. Moore, Rte. 1, Box 118, West River, Md.

Division of Ser. No. 534,007, Dec. 18, 1974, Pat. No. 3,965,283. This application Mar. 5, 1976, Ser. No. 664,202
Int. Cl.² D02G *3/00, 3/44*
U.S. Cl. 428—378 **4 Claims**

1. A method of preparing a manganese oxide coated acrylic fiber which comprises:

immersing of acrylic fiber into a potassium permanganate solution at a temperature from about 50 to about 80° C having a concentration from about 0.3 to about 0.8M for about 8 to about 15 minutes.

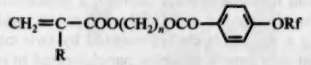
4,087,584

LITHOGRAPHIC PRINTING PLATE

Hiroyoshi Taniguchi, and Takao Igawa, both of Tokyo, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Oct. 20, 1976, Ser. No. 734,104
Claims priority, application Japan, Oct. 31, 1975, 50-131034; Oct. 31, 1975, 50-131035
Int. Cl.² B41M *1/08;* B41N *1/14;* G03F *7/02;* G03G *13/28*
U.S. Cl. 428—422 **7 Claims**

1. A lithographic printing plate comprising a support having an ink-repellent layer thereon, said ink-repellent layer consisting essentially of a polymer of a first monomer having the formula



wherein R is hydrogen or methyl, Rf is perfluoroalkyl having from 3 to 21 carbon atoms, and *n* is an integer of one to 10,

said polymer containing up to 25 percent by weight of units of a second monomer which is copolymerizable with said first monomer.

4,087,585

SELF-ADHERING SILICONE COMPOSITIONS AND PREPARATIONS THEREOF

Jay R. Schulz, Bangor Township, Bay County, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed May 23, 1977, Ser. No. 799,877
Int. Cl.[2] C08G *77/04*; B32B *17/06*
U.S. Cl. 428—429 **39 Claims**

1. A composition comprising a product obtained by mixing

(A) vinyl-containing polyorganosiloxane having an average of about two silicon-bonded vinyl radicals per molecule, an average ratio of organo radicals per silicon atom within a range greater than 2 up to and including 2.03, and each organo radical of the polyorganosiloxane being a monovalent radical selected from the group consisting of hydrocarbon radicals and fluorinated alkyl radicals both having less than 7 carbon atoms per radical,

(B) an organosilicon compound having an average of at least 3 silicon-bonded hydrogen atoms per organosilicon compound molecule and valences of any silicon atom in the organosilicon compound not satisfied by a hydrogen atom is satisfied by a divalent oxygen atom or an organo radical wherein each organo radical is a monovalent radical selected from the group consisting of hydrocarbon radicals and fluorinated alkyl radicals both having less than 7 carbon atoms per radical, the organosilicon compound having no more than one silicon-bonded hydrogen atom on any one silicon atom,

(C) a platinum catalyst,

(D) polysiloxane having an average of at least one silicon-bonded hydroxyl radical per molecule and an average of at least one silicon-bonded vinyl radical per molecule, the polysiloxane having siloxane units bonded through silicon-oxygen-silicon bonds and valences of each silicon atom in the polysiloxane are satisfied by at least one of monovalent alkyl radical having less than 7 carbon atoms per radical, phenyl radical, vinyl radical and hydroxyl radical and the remaining valences of silicon being satisfied by divalent oxygen atoms, the polysiloxane having an average of less than 15 silicon atoms per molecule, and

(E) a silane having at least one epoxy-containing organo group, at least one silicon-bonded alkoxy group having less than 5 carbon atoms per group, and any remaining valences on the silane not satisfied by an epoxy-containing organo group or an alkoxy group is satisfied by a monovalent hydrocarbon radical or a fluorinated alkyl radical both having less than 7 carbon atoms per radical,

(A) and (B) being present in amounts sufficient to provide a mol ratio of silicon-bonded hydrogen atoms in (B) to silicon-bonded vinyl radical in (A) of 0.5 to 10, combined weight of (D) and (E) being present in amounts of 0.1 to 5 parts by weight per 100 parts by weight of the composition exclusive of the weight of (D) and (E), and (D) and (E) being present in a weight ratio of 0.25 to 1.8 parts by weight (E) per one part by weight (D).

4,087,586

ELECTROLESS METAL DEPOSITION AND ARTICLE

Nathan Feldstein, c/o Surface Technology, Inc., Box 2027, Princeton, N.J. 08540

Filed Dec. 29, 1975, Ser. No. 645,198
Int. Cl.[2] C23C *3/02*
U.S. Cl. 428—457 **18 Claims**

12. An article produced by the steps comprising:

a. contacting said article with a colloidal dispersion of insoluble or sparingly soluble compounds of a non-precious metal catalytic agent for electroless plating and excluding hydrous oxides and the product resulting from admixing and interaction of borides with metal ions selected from the group consisting of copper, cobalt, nickel, iron and manganese, and

b. activating said contacted article whereby the induction time for the actual electroless build-up is reduced.

4,087,587

ADHESIVE BLENDS

Mitsuzo Shida, Barrington; John Machonis, Jr., Schaumburg; Seymour Schmukler, and Robert J. Zeitlin, both of Palatine, all of Ill., assignors to Chemplex Company, Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 616,374, Sep. 19, 1975, abandoned. This application Jun. 20, 1977, Ser. No. 808,079
Int. Cl.[2] C08L *51/00*
U.S. Cl. 428—500 **54 Claims**

1. A modified polyolefin blend having improved adhesion to various substrates and consisting essentially of:

(A) about 0.1–95 parts by weight in said blend of a graft copolymer of about 70–99.999 wt.% of a high density polyethylene backbone grafted with about 30–0.001 wt.% of at least one compound containing at least one member of the group consisting of unsaturated acyclic, carbocyclic, heterocyclic, and polycyclic moieties which are fused to at least one carboxylic acid anhydride-containing ring and

(B) about 99.9–5 parts by weight of a polyethylene resin selected from the class consisting of homopolymers of ethylene, copolymers of ethylene and alpha-olefin, terpolymers of ethylene, alpha-olefin and diene and mixtures of these polyethylene resins.

4,087,588

ADHESIVE BLENDS

Mitsuzo Shida, John Machonis, Jr., Schaumburg; Seymour Schmukler, and Robert J. Zeitlin, both of Palatine, all of Ill., assignors to Chemplex Company, Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 616,035, Sep. 22, 1975, abandoned. This application Jun. 20, 1977, Ser. No. 808,080
Int. Cl.[2] C08L *51/00*
U.S. Cl. 428—500 **53 Claims**

1. A modified polyolefin blend having improved adhesion to various substrates and consisting essentially of:

(A) about 0.1–95 parts by weight in said blend of a graft copolymer of about 70–99.999 wt.% of a high density polyethylene backbone grafted with about 30–0.001 wt.% of at least one compound containing at least one member of the group consisting of unsaturated acyclic, carbocyclic, heterocyclic, and polycyclic moieties which are fused to at least one carboxylic acid anhydride-containing ring and

(B) about 99.9–5 parts by weight of a copolymer of ethylene and an ethylenically unsaturated ester or a mixture of these.

4,087,589

COATED ARTICLE

Irwin I. Bessen, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 622,376, Oct. 14, 1975, Pat. No. 4,031,274. This application Nov. 19, 1976, Ser. No. 743,299
Int. Cl.[2] B32B *15/00*
U.S. Cl. 428—596 **5 Claims**

1. An article of an alloy based on an element selected from the group consisting of Fe, Co, Ni and Ti and having an outer surface portion and an inner surface portion of improved oxidation and corrosion resistance, the inner surface portion defining a labyrinthine cavity within the article communicating with the surface through a relatively small diameter opening and generally inaccessible for coating by conventional coating methods including electrodeposition, vapor deposition and heated particle deposition;

the inner surface portion comprising:

a. a substrate portion of the article alloy,

b. an inner coating which includes the coating metals Al, and Cr, and

c. an interdiffusion portion between the substrate portion and the inner coating;

the inner coating having a structure resulting from the interdiffusion of a plurality of coating layers of each of the coating metals positioned sequentially on the substrate portion and further characterized by a coating metal activity sufficient to form, in an oxidizing atmosphere, a protective scale including at least one component selected from the group consisting of oxides of Al, oxides of Cr and spinels including at least one element selected from the group consisting of Al and Cr, and

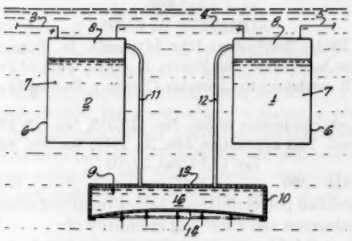
the interdiffusion portion having a structure resulting from diffusion of the coating metal from the inner coating toward the substrate and diffusion of the elements from substrate portion toward the inner coating.

4,087,590

PRESSURE-EQUALIZED ELECTROCHEMICAL BATTERY SYSTEM

Dennis W. Kraft, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 4, 1977, Ser. No. 793,568
Int. Cl.² H01M *14/00*
U.S. Cl. 429—6 **5 Claims**



1. A pressure equalized electrochemical battery system for use in a pressurized seawater environment comprising:

a battery pack formed of a plurality of electrically-interconnected electrochemical batteries each having a battery case containing a conductive fluid electrolyte,

a reservoir means formed as a closed vessel containing a fluid electrolyte for said batteries, and

tube-like means having a constantly-open passageway communicably coupling the electrolyte of said reservior means with the electrolyte of each of said batteries,

said battery cases being formed of a thin-walled semi-rigid casing material and said reservoir vessel including a material having greater compliancy than said battery casing material for compliantly responding to sea-water pressures for constantly forcing said reservoir electrolyte into said battery cases to fill the cases and equalize their internal and external pressures.

4,087,591

PYROTECHNICALLY ACTIVATED LITHIUM-CHLORINE CELL HAVING A LITHIUM VAPOR BARRIER

Frederic M. Bowers, Silver Spring; Judith H. Ambrus, Beltsville, and Michael E. DeGraba, Kensington, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 30, 1976, Ser. No. 757,549
Int. Cl.² H01M *8/14, 8/36*
U.S. Cl. 429—29 **7 Claims**

1. A pyrotechnically activated, high efficiency lithium-chlorine primary cell comprising:

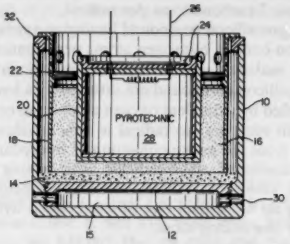
a cell case;

a porous graphite wafer positioned within the cell case to provide a gas receiving chamber;

a fused salt electrolyte contiguous to the porous graphite wafer;

an anode comprising a metal shield which contains a lithium impregnated metal matrix, the anode being in contact with the electrolyte and insulated from the cell case by a refractory electrical insulator, wherein the metal of the shield and the metal of the matrix are selected from the group consisting of nickel and nickel alloys;

a metal cartridge containing a pyrotechnic material, the cartridge being disposed within the anode, wherein the metal is selected from the group consisting of nickel and nickel alloys;



a vapor barrier comprising a porous metal ring impregnated with lithium-chloride said barrier being disposed above said anode and contiguous with both said metal shield and said metal cartridge, wherein the metal of said ring is selected from the group consisting of nickel and nickel alloys;

a source of Cl_2 gas;

means to introduce the Cl_2 gas into the gas receiving chamber; and

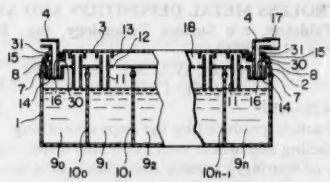
means to activate the pyrotechnic material; wherein, chlorine gas is introduced into the gas receiving chamber and passed through the porous graphite wafer as the pyrotechnic material is activated thereby providing sufficient heat to melt the electrolyte, and to heat the entire cell to its operating temperature, thus generating the flow of ions between the cell electrodes.

4,087,592

WAFER SUPPLY STRUCTURE FOR LIQUID STORAGE BATTERY

Ichiro Okazaki, and Kazumi Nishida, both of Kyoto, Japan, assignors to Japan Storage Battery Company Limited, Kyoto, Japan

Filed Apr. 19, 1977, Ser. No. 788,947
Int. Cl.² H01M *2/36*
U.S. Cl. 429—63 **5 Claims**



1. A liquid storage battery, comprising:

(a) a battery vessel divided into a plurality of cells by a plurality of partition walls integral with said vessel,

(b) a lid member disposed on top of said vessel and thermally bonded thereto to form a tight seal therewith around the

entire periphery thereof, said lid member having integrally formed therein a plurality of vertically disposed liquid level defining tubes individually extending downwardly into the respective cells and upwardly above the surface of the lid member, and a plurality of water supply and gas discharge apertures individually disposed above the respective cells,

(c) a cover member disposed on top of said lid member and thermally bonded thereto to form a tight seal therewith around the entire interface therebetween, said cover member being spaced from said lid member to define a water supply chamber therebetween and having integrally formed therein a plurality of downwardly depending annular cup members individually disposed around the upper ends of the respective tubes, and a pair of openings at the opposite ends thereof,

(d) a pair of water supply pipes individually and sealingly engaged in the respective cover member openings and extending downwardly therefrom to terminate within the water supply chamber,

(e) said vessel, lid member, and cover member being formed of the same thermoplastic material to implement their tight thermal bonding, and

(f) gas/water discharge separator means sealingly coupled to one of said water supply pipes, said separator means comprising a discharge water reservoir, an inlet pipe communicating between said one water supply pipe and said water reservoir, a porous filter member disposed above said reservoir, a discharge water chamber disposed around said filter member and isolated from said discharge water reservoir thereby, and water outlet means disposed in said discharge water chamber above said inlet pipe.

4,087,593

DRIVE SHAFT ASSEMBLY AND METHOD

Orville F. Phelps, and Innis J. MacRitchie, both of Sylvania, Ohio, assignors to Dana Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 670,734, Mar. 26, 1976, abandoned. This application Feb. 14, 1977, Ser. No. 768,655

Int. Cl.[2] B23P *15/04;* **C21D** *9/50*

U.S. Cl. 428—683 **10 Claims**

1. A method for producing a light weight drive shaft assembly of substantially uniform high strength, comprising: welding an end fitting to the end of a tubular shaft of low or medium alloy steel containing 0.25–0.45 percent carbon; heat treating the welded assembly by heating the assembly in a neutral atmosphere to a temperature in the austenitizing region of from 1475° F. to 1800° F., for a time sufficient to bring all areas of the assembly to substantially uniform temperature; quenching the assembly to form a uniform martensitic grain structure by symmetrical immersion of the assembly into a quenching medium; and tempering the assembly by heating the assembly to a temperature of 800° F. to 1200° F., for a time sufficient to bring all areas of the assembly to substantially uniform temperature.

4,087,594

REACTIVATION OF PRIMARY ELECTROCHEMICAL CELLS

Nikola Marincic, and Anthony Lombardi, both of Winchester, Mass., assignors to GTE Laboratories, Incorporated, Waltham, Mass.

Filed Mar. 21, 1977, Ser. No. 779,303

Int. Cl.[2] H01M *6/38*

U.S. Cl. 429—90 **9 Claims**

1. A primary electrochemical cell comprising:

a. a case having an opening at one end;

b. a cover disposed in said opening and adapted to cooperate therewith to provide a seal thereto, said cover including a movable diaphragm portion therein;

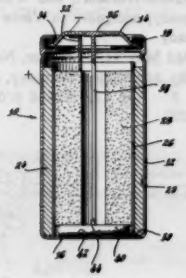
c. an anode, said anode being made of lithium;

d. a cathode;

e. an electrolyte, said anode, cathode and electrolyte being disposed in said case, said electrolyte comprising a Lewis acid, a Lewis base and an inorganic solvent;

f. an ampule disposed within said case in close proximity with said anode and cathode, impervious to said electrolyte;

g. a quantity of a Lewis acid in said ampule, said quantity



being sufficient to dissolve any film of Lewis base formed on the anode of the cell when said cell is not being discharged; and

h. activating means coupled between said ampule and said movable diaphragm portion, said activating means releasing said Lewis acid in said ampule into said electrolyte by moving said cover movable diaphragm portion.

4,087,595

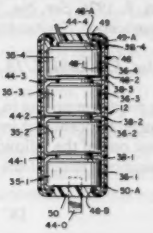
MULTI-CELL BATTERY AND METHOD OF MAKING

P. R. Mallory & Co. Inc., Ossining, N.Y., assignor to P.R. Mallory & Co. Inc., Indianapolis, Ind.

Continuation-in-part of Ser. No. 353,844, Apr. 23, 1973, abandoned. This application Jan. 15, 1976, Ser. No. 649,373

Int. Cl.[2] H01M *6/46*

U.S. Cl. 429—153 **7 Claims**



1. A multi-cell electric battery, comprising a plurality of electrolyte containing cells, with electrical interconnections between the cells and end tabs for the outer cells for connection to an external circuit, disposed within an insulating plastic tube impervious to the electrolyte originally open at both ends; and means for substantially completely sealing the cells within said tube wherein said means includes a hot-melt plastic adhesive material which is adheringly bonded to said insulating tube at said open ends with said plastic material forming end plugs which substantially completely sealingly close said open ends.

5. The method of sealing a multi-cell battery of electrolyte containing cells to prevent electrolyte leakage to the exterior of the battery and to thereby prevent ambiguity and doubt about the operative condition of the battery, comprising:

arranging the cells in appropriate electrical and physical order,

partially enclosing the stacked cells in a plastic enclosure impervious to the electrolyte of the cells, substantially completely closing said enclosure with a melted hot-melt

plastic adhesive material and allowing said adhesive material to solidify to substantially completely seal said enclosure so that no electrolyte can leak out of said enclosure.

4,087,596

POSITIVE ELECTRODE FOR AIR/ZINC ELEMENTS

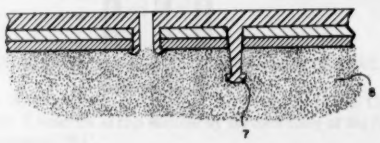
Hans Sauer, Idstein-Walsdorf, and Wolfgang Kloss, Eppstein, both of Germany, assignors to Varta Batterie Aktiengesellschaft, Germany

Filed May 11, 1977, Ser. No. 796,015

Claims priority, application Germany, Jun. 16, 1976, 2626975

Int. Cl.[2] H01M 4/64

U.S. Cl. 429—209 **9 Claims**



1. A positive electrode for air/zinc elements having a depolarizer mass attached to a perforated plastic carrier with interposition of a conductive foil and a metal foil take-off conductor which are also both perforated, wherein

the perforations in the plastic carrier are in the form of hollow rivets extending toward the foils,

the foils are engaged by their own perforations concentrically upon said rivets, and

the rivets have outwardly protruding collars extending over the foils, whereby the foils are attached and their perforations aligned.

4,087,597

ANTI-FOULING COMPOSITIONS

Robert Häfeli, Zurich, Switzerland, assignor to Biomarine Handelsgesellschaft AG., Vaduz, Liechtenstein

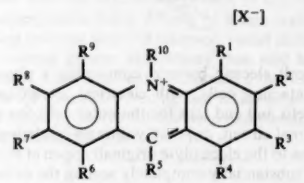
Filed Oct. 8, 1976, Ser. No. 730,719

Claims priority, application Switzerland, Oct. 17, 1976, 13530/76

Int. Cl.[2] C08K 5/18

U.S. Cl. 526—5 **9 Claims**

1. In an anti-fouling paint comprising in a matrix of synthetic resin (1) at least one metal toxicant, the improvement comprising including (2) at least one of the following compounds: (I) a salt of a mono- or diaminoacridine of the formula I



wherein R^1 is hydrogen, amino, methyl, ethyl, methoxy, chloro, nitro, or phenyl,

R^2 is hydrogen, amino, methyl, methoxy, nitro, or dimethylamino,

R^3 is hydrogen, amino, methyl, dimethylamino, methoxy, ethoxy, carbomethoxy, chloro, nitro, phenyl, cyano, or carbamyl,

R^4 is hydrogen, amino, methyl, methoxy, chloro, or nitro,

R^5 is hydrogen, amino, methylamino, β-hydroxyethylamino, or ω-aminoethyl,

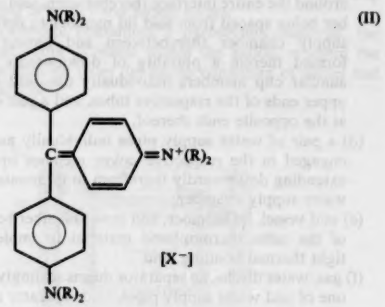
R^6 is hydrogen, amino, or methyl,

R^7 is hydrogen, amino, methyl, methoxy, or chloro,

R^8 is hydrogen, amino, dimethylamino, nitro, or chloro,

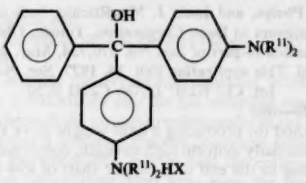
R^9 is hydrogen, or methyl,

R^{10} is hydrogen, or methyl, (II) salts of hexaalkyltriaminobenzenes of the formula II



wherein R is hydrogen, methyl or ethyl,

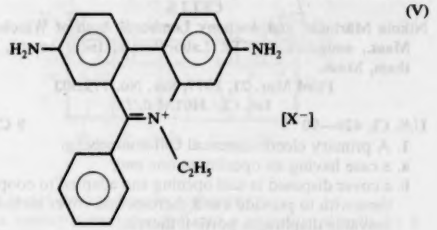
(III) salts of tetraalkyl-p-diaminotriphenyl carbinols of the formula III



wherein R^{11} is methyl or ethyl,

(IV) copper complexes of β-alkylaminoalkylates of the formula IV, R^{13}—NH—R^{12}—CO—O—Cu—O—CO—R^{12}**13** NH—R^{13}, wherein R^{13} is C_2H_{2n+1} wherein n is an integer of from 12 to 22 and R^{12} is —O— or —C_mH_{2m}— wherein m is an integer of from 2 to 4,

(V) salts of 2,7-diamino-10-ethyl-9-phenyl phenantridium,



and X— is an anion in an amount effective to reduce the effect of sulphur producing bacteria on said metal toxicant.

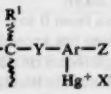
4,087,598

MERCURATED POLYMERS, METHOD FOR THEIR PREPARATION AND POLYMERS PRODUCED THEREFROM

Otto Wichterle; Jiri Coupek, and Miroslava Krivakova, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 384,413, Aug. 1, 1973, abandoned. This application May 5, 1975, Ser. No. 574,632
Claims priority, application Czechoslovakia, Aug. 18, 1972, 5742-72
Int. Cl.[2] C08F *8/42, 30/04*
U.S. Cl. 526—16 6 Claims

1. A copolymer containing aromatically bound mercuric ions having the formula



wherein R is H or CH_3, Y is $—CO(OCH_2.CH_2)_x—O—$ wherein x = 0-20 or —CONH—, X is an anion, Ar is a bifunctional aromatic group, Z=H or NH—R^2 wherein R^2 is acetyl or a carboxy C_1 to C_6 alkyl group and R^1 is the chain of a copolymer formed from the group consisting of methacrylic or acrylic esters of diethylene glycol or dipropylene glycol, methacrylamides or acrylamides, acrylic acid, methacrylic acid, methyl acrylate methyl methacrylate or ethylene dimethacrylate or ethylene diacrylate.

4,087,599

PREPARATION OF A WATER-SOLUBLE POLYVINYLBENZYL QUATERNARY AMMONIUM HALIDE

James M. Roe, Midland, and Duane B. Priddy, Coleman, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 19, 1976, Ser. No. 715,733
Int. Cl.[2] C08F *8/24, 8/44*
U.S. Cl. 526—46 9 Claims

1. In a process for preparing a water-soluble, polyvinylbenzyl quaternary ammonium halide comprising contacting a polystyrene reactant with a halomethylating agent in the presence of a halomethylation catalyst to form a halomethylated polystyrene and thereafter contacting said halomethylated polystyrene with a tertiary amine:

the improvement of employing as the polystyrene reactant a cationically-initiated polystyrene of $\bar{M}_w$ about 1,000 to about 50,000 and a $\bar{M}_w/\bar{M}_n$ ratio of less than about 8.

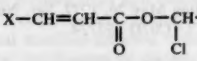
4,087,600

POLYMERS OF TETRACHLOROETHYL ESTERS OF UNSATURATED ORGANIC ACIDS, AND THE METHOD FOR THEIR PREPARATION

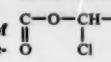
František Hrabák; Milan Bezděk; Karel Bouchal, and Jan Lokaj, all iof Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

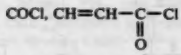
Division of Ser. No. 427,430, Dec. 21, 1973, Pat. No. 3,974,205. This application Apr. 21, 1976, Ser. No. 679,023
Claims priority, application Czechoslovakia, Dec. 28, 1972, 9030/72; Dec. 28, 1972, 9031/72
Int. Cl.[2] C08F *18/00, 120/00, 270/00, 2/00*
U.S. Cl. 526—292 10 Claims

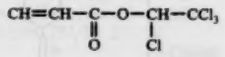
1. A method of producing polymers of a tetrachloroethyl ester of an unsaturated organic acid having the formula



wherein X stands for a substituent selected from the group consisting of COOH, $COOCH_3$, $COOC_2H_5$,







which comprises the steps of heating said ester in the presence of a free-radical polymerization initiator to the temperature of decay of the initiator into free radicals and recovering the polymer thereby formed.

4,087,601

MANUFACTURE OF ETHYLENE/N-BUTYL ACRYLATE COPOLYMERS

Klaus Pfleger; Wieland Zacher; Klaus Boettcher, all of Wesseling; Ronald Skorczyk, Cologne; Oskar Buechner, Dudenhofen, and Franz Georg Mietzner, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Apr. 11, 1977, Ser. No. 786,406
Claims priority, application Germany, Apr. 21, 1976, 2617413
Int. Cl.[2] C08F *210/02*
U.S. Cl. 526—329 5 Claims

1. A process for the manufacture of an ethylene copolymer which contains from 99.9 to 70 percent by weight of ethylene and from 0.1 to 30 percent by weight of n-butyl acrylate as copolymerized units, by copolymerization of ethylene and n-butyl acrylate in a polymerization zone (A) at a pressure above 800 atmospheres and at from 150° to 350° C, with a mean residence time sufficient to cause polymerization but which is at most 100 seconds and temperatures of from 260° to 300° C at the outlet, and immediately passing the reaction mixture obtained after polymerization, via a cooling zone (B), where the temperature of the polymer is rapidly brought to below 250° C, successively into a high pressure product isolation zone (C), a low pressure product isolation zone (D) in which the pressure is from 1 to 10 atmospheres, and a discharge extruder (E), wherein the zones (B) and (C) are at the same pressure of from 250 to 500 atmospheres and at the same constant temperature of from 150° to 250° C, and the mean residence time of the reaction mixture in zones (B) and (C) together is from 2 to 10 minutes.

4,087,602

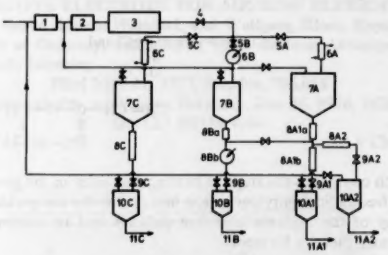
MULTI-STAGE ISOLATION OF HIGH PRESSURE POLYETHYLENE

Franz Georg Mietzner, Ludwigshafen; Oskar Buechner, Dudenhofen; Klaus Steigerwald, Ludwigshafen; Gottfried Schlichthaerle, Neustadt, and Friedrich Urban, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed May 19, 1976, Ser. No. 687,872
Claims priority, application Germany, May 31, 1975, 2524203
Int. Cl.[2] C08F *6/26, 6/28*
U.S. Cl. 528—481 4 Claims

1. A process for the manufacture of an ethylene polymer by homopolymerization of ethylene or copolymerization of ethylene with one or more other compounds which are copolymerizable with ethylene in a continuous polymerization system at a pressure of from 500 to 5,000 bars and a temperature of from 50° to 450° C, followed by isolation of the resulting polymer from the reaction mixture obtained, at from 100° to 400° C, with a mean residence time of from 0.5 to 60 minutes, in a plurality of high-pressure product isolation zones at a pressure

of from 100 to 500 bars and a plurality of subsequent low-pressure product isolation zones at a pressure of from 1 to 10 bars, wherein the various high-pressure product isolation zones which are arranged in parallel are each at a different tempera-



ture, and the various low-pressure product isolation zones are each at different temperatures, the mean product residence times in the various high-pressure and low-pressure product isolation zones being identical or different.

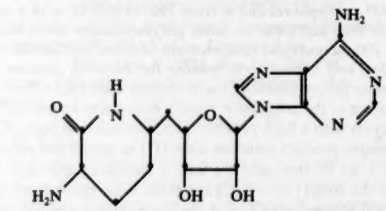
4,087,603

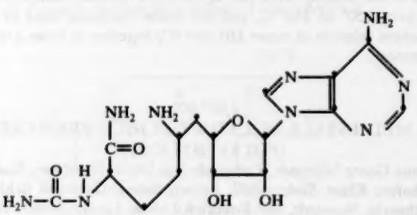
ANTIFUNGAL ANTIBIOTICS

Robert L. Hamill, and Ramakrishnan Nagarajan, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Sep. 27, 1976, Ser. No. 726,725
Int. Cl.[2] C07H *19/16*
U.S. Cl. 536—26 **3 Claims**

1. A compound in substantially pure form selected from the group consisting of





and the pharmaceutically acceptable, non-toxic acid addition salts thereof.

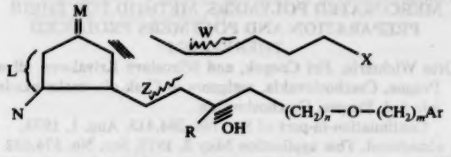
4,087,604

SUBSTITUTED ω-PENTANORPROSTAGLANDINS

Jasjit S. Bindra, Groton, and Michael R. Johnson, Gales Ferry, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 413,708, Nov. 7, 1973, Pat. No. 4,024,179, which is a continuation-in-part of Ser. No. 304,813, Nov. 8, 1972, abandoned. This application Jan. 3, 1977, Ser. No. 756,062
Int. Cl.[2] C07C *177/00*; C07D *257/04*
U.S. Cl. 542—426 **19 Claims**

1. A compound of the structure:



and its C_{15} epimer;

wherein Ar is phenyl, 3,4-dimethoxyphenyl, 3,4-methylenedioxyphenyl, 3,4,5-trimethoxyphenyl; α- or β-naphthyl or monosubstituted phenyl wherein said substituent is halo, trifluoromethyl, phenyl, lower alkyl or lower alkoxy;

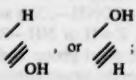
R is hydrogen or lower alkyl;

n and *m* are each integers from 0 to 3 with the proviso that the sum of *n* and *m* does not exceed 3;

W and L are each a single bond or cis double bond;

Z is single bond or trans double bond;

M is keto,



N is hydrogen or α-hydroxyl;

X is tetrazolyl;

and wherein L, M and N are so selected as to complete the structure of a prostaglandin of the A, E, or F series.

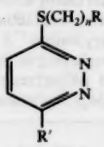
4,087,605

MORPHOLINOALKYLTHIOPYRIDAZINE COMPOUNDS

Joseph E. Dunbar, and Louis E. Begin, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 684,224, May 7, 1976, Pat. No. 4,058,530. This application Jul. 22, 1977, Ser. No. 817,936
Int. Cl.[2] C07D *413/06*
U.S. Cl. 544—114 **4 Claims**

1. A compound corresponding to the formula



and the pharmaceutically-acceptable salts thereof wherein R is morpholinyl;

R′ is a halogen.

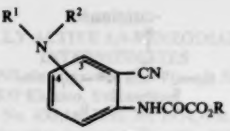
4,087,606

2-CYANO-3- OR 4-(SUBSTITUTED AMINO)OXANILIC ACID DERIVATIVES

Dieter H. Klaubert, West Chester; John H. Sellstedt, Pottstown, and Charles J. Guinosso, King of Prussia, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 710,481, Aug. 4, 1976, Pat. No. 4,054,591, which is a continuation-in-part of Ser. No. 620,626, Oct. 3, 1975, abandoned. This application May 26, 1977, Ser. No. 800,769
Int. Cl.[2] C07D *295/14*
U.S. Cl. 544—163 **6 Claims**

1. A compound of the formula:



in which

R is —H; an alkali metal; $^{+}NH_4$; alkyl of 1 to 6 carbon atoms, inclusive; benzyl or phenethyl; or cycloalkyl of 5 or 6 carbon atoms; and

R^1 and R^2 together, with the nitrogen atom to which they are attached, are aziridinyl, azetidinyl, pyrrolidinyl, piperidinyl, piperazinyl, 4-lower alkyl-piperazinyl, morpholino or thiomorpholino;

or a pharmaceutically acceptable acid addition salt thereof.

4,087,607

PROCESS FOR THE SAFE PRODUCTION OF POLYCHLOROISOCYANURATES

Italo A. Capuano, Orange, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Nov. 24, 1976, Ser. No. 744,489
Int. Cl.² C07D *251/36*
U.S. Cl. 544—190 **9 Claims**

1. In a continuous process for producing a polychloroisocyanurate product by reacting a liquid containing a cyanuric acid component with a chlorinating agent at a temperature of from about −5° to about 45° C to produce a liquid reaction mixture containing a polychloroisocyanurate product and any by-product nitrogen trichloride obtained, the improvement which comprises:

a. supplying said liquid containing cyanuric acid component through flow control means into a reactor,

b. supplying said chlorinating agent through flow control means into said reactor,

c. passing a purge gas through flow control means to said reactor to admix with said reaction mixture to form an effluent gas,

d. removing said effluent gas from said reactor,

e. introducing a portion of said effluent gas into a gas analyzer,

f. determining said nitrogen trichloride concentration in said effluent gas,

g. recording said concentration of nitrogen trichloride on a recording device,

h. providing said recording device with an upper limit for the concentration of nitrogen trichloride in said effluent gas,

i. comparing said upper limit with said recorded concentration of nitrogen trichloride of step (*g*), and

j. activating said flow control means for said purge gas to increase said flow of purge gas to said reactor when said recorded concentration equals or exceeds said upper limit.

4,087,608

PRODUCTION OF CHLORO-S-TRIAZINE TRIONES

Stephen M. Balaban, Chesterfield, Mo., and Raymond C. Cox, Jr., Belleville, Ill., assignors to Monsanto Company, St. Louis, Mo.

Filed Jul. 5, 1977, Ser. No. 812,556
Int. Cl.² C07D *251/36*
U.S. Cl. 544—190 **6 Claims**

1. In a process for preparing a chloro-s-triazine trione selected from the group consisting of dichloro-s-triazine trione, trichloro-s-triazine trione and mixtures thereof by the reaction of cyanuric acid with an alkali metal hydroxide and chlorine in an aqueous reaction mixture and recovering the chloro-s-triazine trione product from said reaction mixture, the improvement which comprises conducting the reaction in the presence of a crystal modifier selected from the group consisting of alkali metal disulfonates of alkylated diphenyloxide wherein the alkyl group contains from about 8 to about 14 carbon atoms, and alkylated diphenyloxide disulfonic acid wherein the alkyl group contains from about 8 to about 14 carbon atoms.

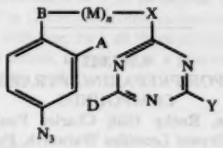
4,087,609

AZIDO-TRIAZINES

Nathan L. Smith, Miami, Fla., and Vithal J. Rajadhyaksha, Mission Viejo, Calif., assignors to Nelson Research & Development Company, Irvine, Calif.

Continuation-in-part of Ser. No. 573,364, Apr. 30, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 741,896
Int. Cl.² C07D *251/38, 251/46, 251/50, 251/54*
U.S. Cl. 544—211 **3 Claims**

1. A compound having the structural formula



where B is sleected from the group consisting of NR, O, S and CH_2; $(M)_a$ is a saturated or unsaturated aliphatic hydrocarbon chain having 1–12 carbon atoms; X is selected from the group consisting of NR, O and S; A is selected from the group consisting of SO_2R, CN, NO_2 and H; Y is selected from the group consisting of NR_2, N_3, halogen and SH; R is selected from the group consisting of H and a lower alkyl group; and D is selected from the group consisting of N_3 and halogen.

4,087,610

PROCESS FOR THE PREPARATION OF 5-ACETOACETYLAMINO-BENZIMIDAZOLONE

Wilfried Sahm, Kelkheim, Taunus; Ernst Hille, Rossert, Taunus, and Wolfgang Schiller, Sulzbach, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 27, 1976, Ser. No. 680,719
Claims priority, application Germany, Apr. 29, 1975, 2518922
Int. Cl.² C07D *235/26*
U.S. Cl. 548—305 **12 Claims**

1. A process for the preparation of 5-acetoacetylamino benzimidazolone-(2) which comprises reacting diketene with an aqueous solution of a salt of 5-amino-benzimidazolone-(2) and an acid having a pKa value of 1 to 7, said solution containing an anti-oxidant and/or a reducing agent.

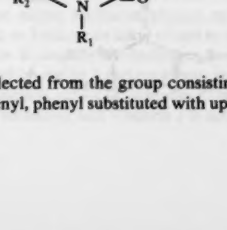
4,087,611

OPTICALLY ACTIVE 1-OXYETHYL-4-PHENYL-2-IMIDAZOLIDONES

Sivaraman Raghu, Norwalk; Arthur Kentaro Hoffmann, New Canaan, and Balwant Singh, Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 680,302, Apr. 26, 1976, abandoned. This application Nov. 8, 1976, Ser. No. 739,923
Int. Cl.² C07D *233/32, 233/38*
U.S. Cl. 548—320 **25 Claims**

1. An optically active compound of the formula:



wherein R is selected from the group consisting of hydrogen, C_1–C_6 alkyl, phenyl, phenyl substituted with up to three groups

selected from the group consisting of C_1–C_6 alkyl, halo and C_1–C_6 alkoxy and a moiety of the formula COR_3, wherein R_3 is selected from the group consisting of hydrogen, C_1–C_6 alkyl, C_1–C_6 alkoxy, phenoxy, halo C_1–C_6 alkyl, phenyl, and phenyl or phenoxy substituted with up to four groups selected from the group consisting of C_1–C_6 alkyl, halo, trifluoromethyl and C_1–C_6 alkoxy; R_1 is selected from the group consisting of hydrogen and a moiety of the formula COR_4, wherein R_4 is selected from the group consisting of C_1–C_6 alkyl, C_1–C_6 alkoxy, phenoxy, C_5–C_{10} cycloalkyl, phenyl, and phenyl or phenoxy substituted with up to four groups selected from the group consisting of C_1–C_6 alkyl, C_1–C_6 alkoxy, halo and trifluoromethyl; and R_2 is selected from the group consisting of phenyl and phenyl substituted with up to two groups selected from the group consisting of C_1–C_6 alkyl, C_1–C_6 alkoxy, halo and trifluoromethyl.

4,087,612

PROCESS FOR PREPARING PYRAZOLIDINES COMPOUNDS

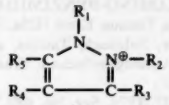
Barrington Cross, Rocky Hill; Charles Paul Grasso, East Windsor, and Bryant Leonidas Walworth, Pennington, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 624,154, Oct. 20, 1975, abandoned, which is a division of Ser. No. 526,358, Nov. 22, 1974, Pat. No. 3,948,936. This application Dec. 16, 1976, Ser. No. 751,301

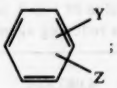
Int. Cl.[2] C07D *231/04*

U.S. Cl. 548—356 **4 Claims**

1. A process for the preparation of a pyrazolidine compound which comprises the step of: reducing at temperatures ranging from room temperature to reflux temperatures in the presence of a molar excess of sodium borohydride dissolved in a lower monohydric alcohol, a compound defined as follows:

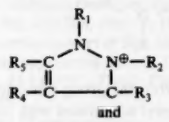


wherein R_1 and R_2 each represent alkyl C_1–C_4; R_3 and R_5 each represent members selected from the group consisting of cycloalkyl C_3–C_7, methylcycloalkyl C_4–C_8, cycloalkenyl C_3–C_7, benzyl, alkyl C_2–C_{12} and



Y and Z each represent members selected from the group consisting of hydrogen, halogen, alkyl C_1–C_4, alkoxy C_1–C_4 and carboxyl, R_4 represents a member selected from the group consisting of hydrogen, alkyl C_1–C_{10} and alkoxy C_1–C_4, provided when R_4 is hydrogen or methyl, at least one of R_3 and R_5 is a member other than phenyl; and A is an anion, and thereafter recovering resultant pyrazolidine compound.

3. A process for the preparation of a pyrazolidine compound which comprises the steps of: reducing at room temperature in the presence of a molar excess of sodium borohydride dissolved in a lower monohydric alcohol, a compound selected from the group consisting of:



and

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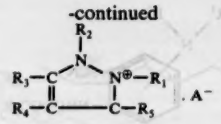
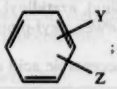


wherein R_1 and R_2 each represent alkyl C_1–C_4; R_3 and R_5 each represent members selected from the group consisting of cycloalkyl C_3–C_7, methylcycloalkyl C_4–C_8, cycloalkenyl C_3–C_7, benzyl, alkyl C_2–C_{12} and



Y and Z each represent members selected from the group consisting of hydrogen, halogen, alkyl C_1–C_4, alkoxy C_1–C_4 and carboxyl, R_4 represents a member selected from the group consisting of hydrogen, alkyl C_1–C_{10} and alkoxy C_1–C_4, provided when R_4 is hydrogen or methyl, at least one of R_3 and R_5 is a member other than phenyl; and A is an anion, and thereafter recovering resultant pyrazolidine compound.

4,087,613

1,3,5- OR 1,3,6-NAPHTHALENETRIYLTRIS(SULFONYLIMINO)ARYL ACIDS AND SALTS

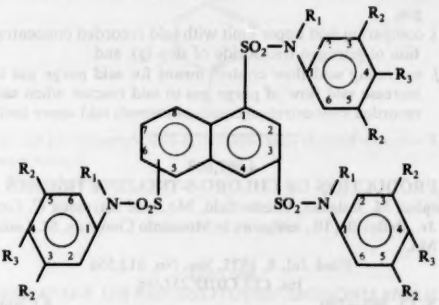
Ransom Brown Conrow, Pearl River, and Seymour Bernstein, New City, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 28, 1977, Ser. No. 782,212

Int. Cl.[2] C07C *143/80*

U.S. Cl. 560—10 **25 Claims**

1. A compound of the formula:



wherein R_1 is selected from the group consisting of hydrogen and methyl; R_2 is selected from the group consisting of hydrogen, carboxyl and $COOR_4$, wherein R_4 is selected from the group consisting of alkali metal and alkaline earth metal; R_3 is selected from the group consisting of hydrogen, hydroxy and $COOR_4$, wherein R_4 is as previously defined; with the proviso that each phenyl must contain at least one $COOR_4$; or another nontoxic pharmaceutically acceptable salt thereof.

4,087,614
OPTICALLY ACTIVE 1,4-BENZODIAZEPINES INTERMEDIATES

Franjo Kajfez; Nikola Blazevic, and Vitomir Sunjic, all of 18, Via Motta, 6830 Chiasso, Switzerland

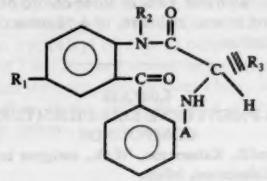
Division of Ser. No. 493,145, Jul. 30, 1974, Pat. No. 3,998,811, which is a continuation-in-part of Ser. No. 234,645, Mar. 14, 1972, abandoned. This application Jul. 29, 1976, Ser. No. 709,859

Claims priority, application Switzerland, Mar. 17, 1971, 3868/71

Int. Cl.[2] C07C *125/06;* C07D *209/20*

U.S. Cl. 560—27 3 Claims

1. A compound having the formula:



in the S optical configuration wherein R_1 is selected from the group consisting of hydrogen, halogen, nitro and trifluoromethyl, R_2 is selected from the group consisting of hydrogen and C_{1-4} lower alkyl, and R_3 is selected from the group consisting of C_{1-4} lower alkyl, hydroxy C_{1-4} lower alkyl, phenyl, hydroxyphenyl, benzyl, hydroxybenzyl, and 3'-methyleneindolyl, and A is a protective group selected from the group consisting of tertiarybutoxy carbonyl and carbobenzoxy.

4,087,615
3,7-INTER-M-PHENYLENE-4,5,6-TRINOR-13,14-DIHYDRO-PGD$_1$ COMPOUNDS

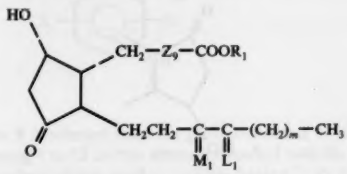
Douglas Ross Morton, Jr., Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 614,242, Sep. 17, 1975, Pat. No. 4,016,184. This application Dec. 30, 1976, Ser. No. 755,736

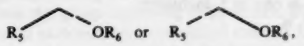
Int. Cl.[2] C07C *69/76*

U.S. Cl. 560—53 25 Claims

1. A prostaglandin analog of the formula



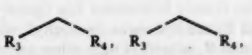
wherein *m* is one to 5, inclusive; wherein M_1 is



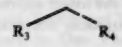
or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

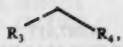
wherein L_1 is



or a mixture of



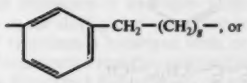
and



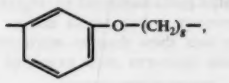
wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation; and

wherein Z_9 is



(1)



(2)

wherein *g* is one, 2, or 3.

4,087,616
16-PHENOXY PROSTAGLANDIN A2 ANALOGS

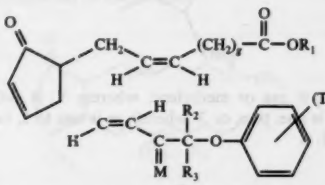
Norman A. Nelson, Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 426,058, Dec. 19, 1973, which is a division of Ser. No. 252,030, May 10, 1972. This application Feb. 7, 1977, Ser. No. 765,997

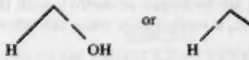
Int. Cl.[2] C07C *69/76*

U.S. Cl. 560—53 10 Claims

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein *g* is an integer from 2 to 5, inclusive; wherein M is



wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 and R_3 are hydrogen, methyl, or ethyl; wherein T is alkyl of one to 3 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl, or $—OR_4$ wherein R_4 is alkyl of one to 3 carbon atoms, inclusive, and wherein *s* is zero, one, 2, or 3,

with the proviso that not more than two T's are other than alkyl; including each of the lower monoalkanoates thereof, and each of the pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,087,617

INTER-M-PHENYLENE-13,14-DIDEHYDRO-PGF$_1$ COMPOUNDS

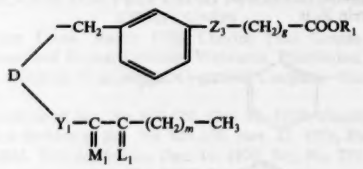
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 657,739, Feb. 13, 1976, Pat. No. 4,029,681. This application Mar. 7, 1977, Ser. No. 776,555

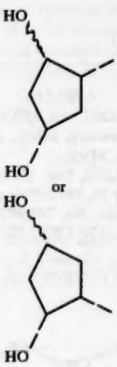
Int. Cl.^{2} C07C *69/76*

U.S. Cl. 560—55 **73 Claims**

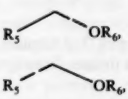
1. A prostaglandin analog of the formula:



wherein D is

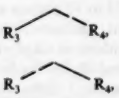


wherein Z_3 is oxa or methylene; wherein Y_1 is —C≡C—; wherein *g* is one, two, or 3; wherein *m* is one to 5, inclusive; wherein M_1 is

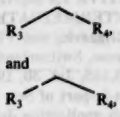


wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



or a mixture of



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,087,618

INTER-M-PHENYLENE-13,14-DIDEHYDRO-PGE$_1$ COMPOUNDS

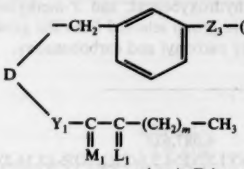
Herman W. Smith, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 657,739, Feb. 13, 1976, Pat. No. 4,029,681. This application Mar. 7, 1977, Ser. No. 775,071

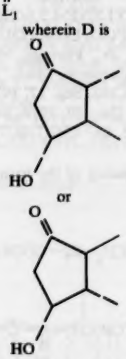
Int. Cl.^{2} C07C *69/76*

U.S. Cl. 560—53 **73 Claims**

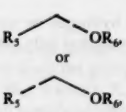
1. A prostaglandin analog of the formula:



wherein D is

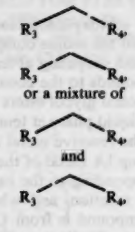


wherein Z_3 is oxa or methylene;
wherein Y_1 is —C≡C—;
wherein *g* is one, two or 3;
wherein *m* is one to 5, inclusive;
wherein M_1 is



wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;

wherein L_1 is



wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;

wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically aceptable cation.

4,087,619

AMINE CONTAINING ANTIOXIDANTS

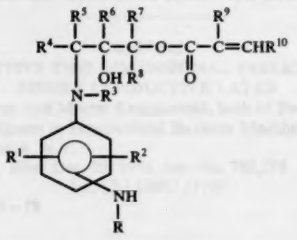
Carl R. Parks, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 450,696, Mar. 13, 1974, Pat. No. 3,979,436, which is a division of Ser. No. 153,446, Jun. 15, 1971, Pat. No. 3,817,916. This application Apr. 9, 1976, Ser. No. 675,410

Int. Cl.² C07C *69/76*

U.S. Cl. 560—104 **4 Claims**

1. A compound having the following structural formula:



wherein R is selected from the group consisting of alkyl radicals having 1 to 12 carbon atoms, cycloalkyl radicals having 5 to 12 carbon atoms, aralkyl radicals having 7 to 24 carbon atoms and aryl radicals having 6 to 24 carbon atoms wherein R^1 and R^2 are selected from the group consisting of hydrogen and alkyl groups having 1 to 4 carbon atoms and wherein R^3 is selected from the group consisting of hydrogen, alkyl radicals having 1 to 12 carbon atoms, cycloalkyl radicals having from 5 to 12 carbon atoms, and aralkyl radicals having 7 to 24 carbon atoms, wherein R^4, R^5, R^6, R^7, and R^8 are selected from the group consisting of hydrogen and alkyl radicals having from 1 to 4 carbon atoms, wherein R^9 is selected from the group consisting of hydrogen and alkyl radicals having from 1 to 4 carbon atoms, and wherein R^{10} is selected from the group consisting of phenyl and substituted phenyl radicals, wherein the substituted phenyl radical is substituted by a radical selected from the group consisting of alkyl radicals having 1 to 4 carbon atoms and alkoxy radicals having 1 to 2 carbon atoms.

4,087,620

15-CYCLOALKYL-PROSTAGLANDIN DERIVATIVES

Masaki Hayashi; Seiji Kori, both of Takatsuki; Isao Ohyama, Osaka; Sadahiko Iguchi, Kyoto, and Takanori Okada, Osaka, all of Japan, assignors to Ono Pharmaceutical Company, Osaka, Japan

Filed Jul. 7, 1976, Ser. No. 703,158

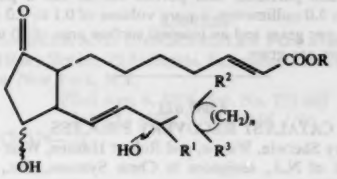
Claims priority, application United Kingdom, Jul. 17, 1975, 30072/75; May 6, 1976, 18651/76

Int. Cl.² C07C *177/00*

U.S. Cl. 560—121 **8 Claims**

1. Prostaglandin analogues of the formula:

VII



wherein R represents a hydrogen atom or a straight- or branched- chain alkyl group containing from 1 to 12 carbon atoms, R^1 represents a hydrogen atom or a methyl or ethyl group, R^2 represents a straight- or branched-chain alkyl group containing from 2 to 8 carbon atoms, R^3 represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 3 carbon atoms, and *n* represents 4 or 5, and cyclodextrin clathrates of such acids and esters and, when R represents a hydrogen atom, non-toxic salts thereof.

4,087,621

7-{3-HYDROXY-2β-[4-HYDROXY-4-(LOWER ALKYL)-TRANS-1-OCTEN-1-YL]-5-OXOCYCLOPENT-1α-YL}HEPT-5-CIS-ENOIC ACIDS AND RELATED COMPOUNDS

Paul W. Collins, Deerfield, and Raphael Pappo, Skokie, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 454,913, Mar. 26, 1974, Pat. No. 3,965,143. This application Nov. 10, 1975, Ser. No. 630,394

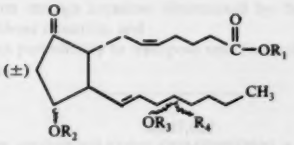
Claims priority, application South Africa, Mar. 6, 1975, 75/1391

Int. Cl.² C07C *177/00*

U.S. Cl. 560—231 **9 Claims**

1. A compound of the formula

(I)



wherein R_1 is hydrogen or lower alkyl; R_2 is hydrogen or a lower alkanoyl, tetrahydropyran-2-yl, or tri(lower alkyl)silyl radical; R_3 is hydrogen or a lower alkanoyl, or tri(lower alkyl)-silyl radical; R_4 is a lower alkyl radical; and the wavy lines represent the alternative R or S configuration.

4,087,622

METHOD OF PRODUCING VINYL ACETATE

Michihiro Nakamura; Yuzuru Fujiwara, and Teruo Yasui, all of Kurashiki, Japan, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jun. 23, 1975, Ser. No. 589,619

Claims priority, application Japan, Jun. 27, 1974, 49-73713

Int. Cl.² C07C *67/05*

U.S. Cl. 560—245 **5 Claims**

1. A method of producing vinyl acetate, which comprises

reacting ethylene, oxygen and acetic acid, in vapor phase, in the presence of a catalyst comprising a particulate, porous carrier, at least predominantly comprised of a member selected from the group consisting of silica, alumina, and mixtures thereof supporting 0.3 to 3.0 percent by weight of palladium metal, 0.0157 to 1.8 percent by weight of gold metal, and 1 to 30 percent by weight of an alkali metal acetate, all based on the weight of said carrier, and wherein and on said carrier at least 90 percent by weight of each of the supported palladium and gold is distributed proximate the external surfaces of the carrier particles, extending to depths no greater than about 30% of particles radius as measured from the exterior surface to the center of such particles, said porous carrier has a particle radius 1.0 to 5.0 millimeters, a pore volume of 0.1 to 2.0 cubic centimeters per gram and an internal surface area of 10 to 350 square meters per gram.

4,087,623

CATALYST RECOVERY PROCESS

Martin Barry Sherwin, Wayne, and Robert Hansen, West Caldwell, both of N.J., assignors to Chem Systems, Inc., New York, N.Y.

Filed Oct. 1, 1976, Ser. No. 728,551
Int. Cl.[2] C07C *67/05*
U.S. Cl. 560—246 **6 Claims**

1. In a process for producing vicinal glycol esters by the acetoxylation reaction of an olefin, a carboxylic acid, and oxygen in the presence of an iodine catalyst, the improvement of recycling the iodine catalyst to the reactor comprising the steps in order:

(a) fractionating the acetoxylation reactor effluent to separate at least some of the iodine compounds from the vicinal glycol esters and recycling at least some of the separated iodine compounds to the acetoxylation reactor;

(b) contacting the vicinal glycol esters with a reactive metal compound in the liquid phase at temperatures from 80° to 250° C, wherein the reactive metal compound is the carboxylate of a Group IA metal of the Periodic Table, said carboxylate corresponding to the carboxylic acid used in the acetoxylation reaction, and wherein the amount of reactive metal compound is from 1 to 10 equivalents of metal per equivalent of iodine remaining in the esters after step (a), thereby forming a metal iodide;

(c) separating the metal iodide;

(d) contacting the metal iodide in the liquid phase with a carboxylic acid and hydrogen peroxide at temperatures from 10° to 80° C, wherein the molar ratio of carboxylic acid to metal iodide is at least 1/1 and the molar ratio of hydrogen peroxide to metal iodide at least 0.8/1, thereby forming elemental iodide and a metal carboxylate, wherein the carboxylate is the same as the carboxylate in step (b);

(e) recovering the elemental iodine and recycling at least some of it to the acetoxylation reactor; and

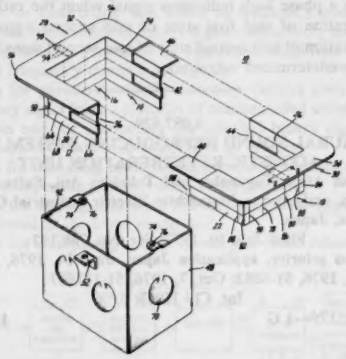
(f) recycling at least a part of the metal carboxylate formed in step (d) to step (b) to serve as the reactive metal compound.

4,087,624

FIRE SHIELD FOR ELECTRICAL BOX

Robert A. Hitchcock, 1906 Danny Dr., Fort Wayne, Ind. 46808

Filed May 17, 1976, Ser. No. 686,696
Int. Cl.[2] A62C *3/16*
U.S. Cl. 174—57 3 Claims



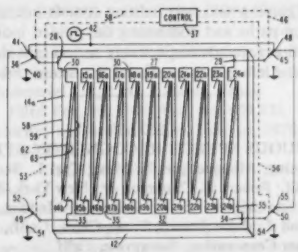
1. For use with an electrical box mounted in an opening in a building wall, a fire shield device for inhibiting fire in said box from reaching said wall surrounding said opening, said device being formed of fire-resistant material and comprising opposite side and end walls defining a rectangle and adapted to fit within said box, said device walls having opposite edges, and a substantially continuous, outwardly extending peripheral flange joined to one of said edges of said device walls and adapted to engage the outer surface of said building wall surrounding said opening, said device walls having means thereon for breaking-away predetermined peripherally extending segments thereof parallel with said edges thereby selectively to shorten the height of said device walls so as to accommodate said device to a particular box and building wall thickness, each of at least two opposite ones of said device walls having means thereon for adjusting the length thereof thereby to accommodate said device to the interior of a particular box.

4,087,625

CAPACITIVE TWO DIMENSIONAL TABLET WITH SINGLE CONDUCTIVE LAYER

Herbert Dym, and Morris Krakinowski, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 29, 1976, Ser. No. 755,273
Int. Cl.[2] G08C *21/00*
U.S. Cl. 178—19 8 Claims



1. A capacitive tablet having a single layer of electrodes in the active area of the tablet, comprising,

a generally planar insulating member having a unitary surface forming a support,

a plurality of electrode pairs formed on said support, each pair being shaped to establish a relatively thin line of equi-potential when the two electrodes of a pair are electrically energized at the same alternating voltage, said pairs being closely spaced to establish a parallel array of said lines on said support,

each element of a pair being spaced apart to be differently energized and being complementarily shaped to establish a voltage gradient along each said line at the operating height of a pen above the tablet when the electrodes of a pair are differently energized, and

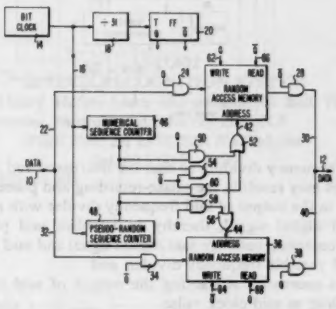
means for energizing the electrodes for pen position determining operations.

4,087,626

SCRAMBLER AND UNSCRAMBLER FOR SERIAL DATA

Roy Henry Brader, Philadelphia, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 4, 1976, Ser. No. 711,449
Int. Cl.[2] H04L *9/00;* H04K *1/06*
U.S. Cl. 178—22 6 Claims



1. A data reordering system, comprising

first and second random access memories,

a numerical memory address counter providing addresses in numerical sequence,

a pseudo-random memory address counter providing addresses in a pseudo-random sequence,

means to store serial data in said first memory in storage locations determined by one of said address counters while serially reading data out of said second memory from storage locations determined by the other of said address counters, and

means periodically to transpose said first and second memories.

4,087,627

CLOCK REGENERATOR COMPRISING A REVERSIBLE SHIFT REGISTER AND A CONTROLLABLE FREQUENCY DIVIDER

Yoshio Sato, and Kazuhiro Ikeda, both of Tokyo, Japan, assignors to Nippon Telegraph & Telephone Public Corporation and Nippon Electric Co., Ltd., both of Tokyo, Japan

Filed Oct. 12, 1976, Ser. No. 731,152
Int. Cl.[2] H04L *7/00*
U.S. Cl. 178—69.1 3 Claims

1. A clock pulse generator for generating a clock pulse having a repetition frequency substantially equal to the bit rate of an incoming digital signal and being in phase-synchronization therewith, said generator comprising:

an input means for receiving said digital signal;

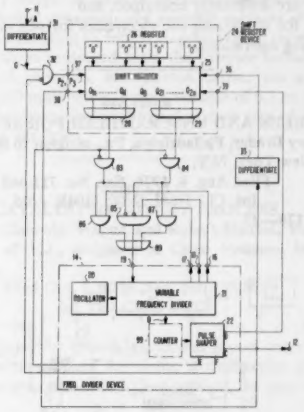
a frequency-stabilized oscillator having a predetermined oscillation frequency substantially equal to an integral multiple of said bit rate;

a variable frequency divider responsive to a control signal

for frequency dividing the output of said oscillator at a rate depending on said control signal;

means coupled to said input means and said frequency divider for comparing the phase of the output of said frequency divider with that of said digital signal;

means responsive to said phase comparing means for producing said control signal to effect the change in said rate



of frequency dividing so that the decreased and increased rates may result in the phase-retarding and phase-advancing in the output of said frequency divider with respect to said digital signal, thereby to establish said phase-synchronization between said digital signal and said output of said variable frequency divider; and

output means for extracting the output of said frequency divider as said clock pulse.

4,087,628

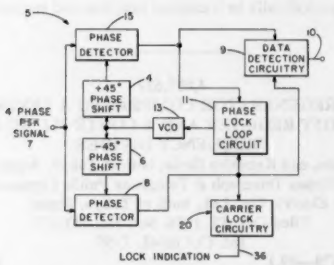
CARRIER LOCK DETECTOR

David E. Sanders; Alfred T. Anderson, both of St. Petersburg, and Robert S. Gordy, Largo, all of Fla., assignors to E-Systems, Inc., Dallas, Tex.

Continuation of Ser. No. 591,193, Jun. 27, 1975, abandoned. This application Oct. 13, 1976, Ser. No. 731,963

Int. Cl.[2] G08B *21/00*

U.S. Cl. 178—88 **6 Claims**



1. Apparatus for detecting phase lock between a multiphase carrier signal and a local oscillator signal in a phase-locked loop demodulator, comprising:

a. first means for generating a phase differential signal by phase comparing said multiphase carrier signal and said local oscillator signal,

b. second means for generating a first signal by full-wave rectifying said phase differential signal,

c. third means responsive to said first signal for generating a second signal with a first state when the amplitude of said first signal is between a pair of predetermined amplitude values and with a second state when the amplitude of said first signal is not between said pair of predetermined amplitude values,

d. fourth means responsive to said second signal for generating a phase lock indication signal when the ratio of the duration of said first state of said second signal to the duration of said second state of said second signal exceeds a predetermined magnitude.

4,087,629

BINAURAL SOUND REPRODUCING SYSTEM WITH ACOUSTIC REVERBERATION UNIT

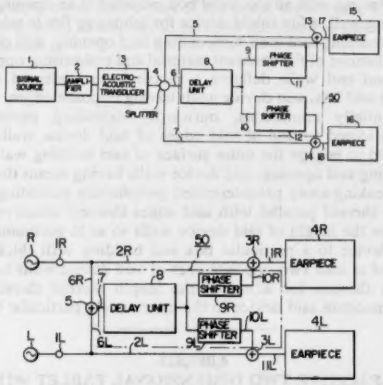
Nobuhisa Atoji, Toyanaka, and Takahisa Aoi, Suita, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 10, 1977, Ser. No. 758,142

Claims priority, application Japan, Jan. 14, 1976, 51-3499; Jan. 23, 1976, 51-6852; Oct. 7, 1976, 51-121037

Int. Cl.[2] H04R *5/00*

U.S. Cl. 179—1 G **15 Claims**



1. A binaural sound reproducing system comprising a pair of acoustic transmission paths for transmitting a sound wave radiated from a electro-acoustic transducer directly toward the left and right ears of a listener as direct sounds, an acoustic reverberation unit for adding an acoustic reverberation effect to the sound wave radiated from said electro-acoustic transducer to produce two indirect sounds of different phases, and means for guiding said two indirect sounds into said acoustic transmission paths and combining the guided indirect sounds with said direct sounds respectively to transmit the combined sounds to the left and right ears of the listener respectively.

4,087,630

CONTINUOUS SPEECH RECOGNITION APPARATUS

Iben Browning, Albuquerque, N. Mex.; Carl L. Berney, Sunnyvale, Calif.; Robert G. Chapman, Jr., New York, N.Y.; George Glaser, San Mateo, Calif.; John D. Madden, Sunnyvale, Calif., and L. John Postas, Santa Clara, Calif., assignors to Centigram Corporation, Sunnyvale, Calif.

Filed May 12, 1977, Ser. No. 796,191

Int. Cl.[2] G10L *1/00*

U.S. Cl. 179—1 SD **18 Claims**

1. Speech recognition apparatus capable of operating in either a learn mode or a recognize mode comprising:

means for converting audible speech into an electrical signal;

signal processing means for sampling a time slice of said

electrical signal and for developing a plurality of digital signals representative thereof;

spectrum analyzing means for receiving said plurality of digital signals and for developing a series of frequency component signals each of which is indicative of the amplitude of a particular frequency component in said time slice;

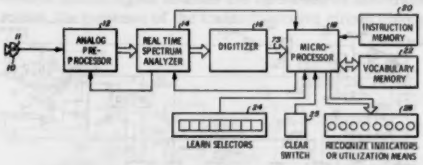
means for converting said series of frequency component signals into a series of binary digits respectively indicating the presence or absence of significant amplitude in each said frequency component signal;

means for pseudo-randomly selecting various ones of said binary digits from a plurality of concatenated series of said digits and for combining the selected binary digits into groups of n data bits, where n is an integer;

means for decoding each of said groups of n bits to develop a corresponding binary word of length 2^n;

means for storing said binary word when said apparatus is operated in the learn mode; and

means for comparing words developed from subsequently



input speech to each of said stored words, and for developing an output signal when a predetermined correlation is found to exist between the compared input word and a particular stored word, such output signal indicating that said subsequently input speech has been recognized.

15. A speech recognition method comprising;

converting a voice signal into a corresponding analog electrical signal;

separating said analog signal into time slices of signal;

analyzing each said time slice for frequency content to develop a sonogram comprised of a series of digital characters each of which corresponds to the relative magnitude of a particular frequency component of the time slice;

accumulating a plurality of said sonograms;

using an n-tuple technique to develop a word pattern from said accumulated sonograms;

comparing said word pattern to each of a plurality of previously stored word patterns, each time counting the number of bits in the compared patterns; and

generating a recognition indication when the number of matched bits satisfies a predetermined criteria.

4,087,631

PROJECTED SOUND LOCALIZATION HEADPHONE APPARATUS

Akitoshi Yamada, Daito; Yoichi Kimura, Suita, and Yoshinobu Kikuchi, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 19, 1976, Ser. No. 659,525

Claims priority, application Japan, Jul. 16, 1975, 50-87732; Jul. 1, 1975, 50-81696

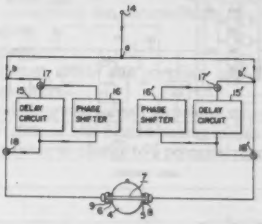
Int. Cl.² H04R *5/00, 3/00*

U.S. Cl. 179—1 G **5 Claims**

2. A headphone apparatus for receiving an output signal from an electroacoustic apparatus comprising:

first and second electroacoustic transducers coupled to the output of said electroacoustic apparatus, and

first and second reverberation circuits coupled to the output of said electroacoustic apparatus and to said first and second electroacoustic transducers respectively, each of said reverberation circuits comprising a phase shifter and a delay circuit coupled thereacross, said delay circuit feeding back the output of said phase shifter to the input thereof, said first and second reverberation circuits generating indirect audio signals which are applied, together



with direct audio signals from said electroacoustic apparatus to said first and second electroacoustic transducers, respectively.

4,087,632

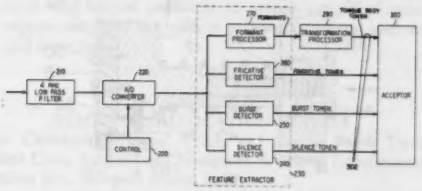
SPEECH RECOGNITION SYSTEM

Edward Henry Hafer, Lisle, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 26, 1976, Ser. No. 745,066

Int. Cl.² G10L *1/00*

U.S. Cl. 179—1 SD **11 Claims**



1. A speech recognition system responsive to sampled representations of applied speech comprising:

an extended feature extractor, responsive to said sampled representations, for determining features of speech contained in said sampled representations, including a feature corresponding to the tongue body position and its direction of movement; and

an acceptor, responsive to said feature extractor, for matching the sequence of said determined features to predetermined sequences of features corresponding to selected words.

4,087,633

DEREVERBERATION SYSTEM

James William Fitzwilliam, Summit, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 18, 1977, Ser. No. 816,525

Int. Cl.² H04R *3/02*

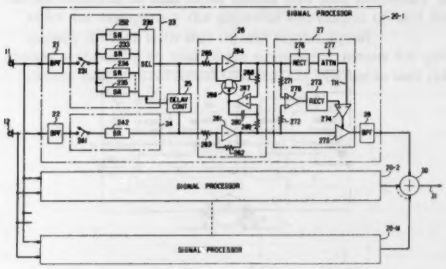
U.S. Cl. 179—1 P **16 Claims**

3. A speech dereverberation system including two microphones connected to a signal processor characterized by:

first means for equalizing the time delay between the signals of said two microphones applied to said signal processor to develop two delay-equalized signals;

second means for equalizing amplitudes of said two delay-

equalized signals to develop two delay and amplitude-equalized signals; and



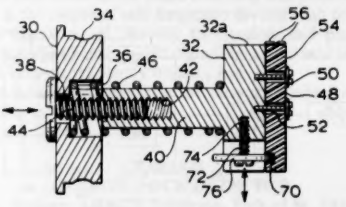
third means for selecting time intervals of said two delay and amplitude-equalized signals which are within preselected percentage amplitude tolerance of each other.

4,087,634

DUAL SOUND TRACK SENSOR AND CALIBRATION STRIP THEREFOR

Kenneth Donald Fraser, 56 Gatesview Avenue, Scarborough, Ontario, Canada

Filed Dec. 8, 1975, Ser. No. 638,349
Int. Cl.[2] G03B *31/02*
U.S. Cl. 179—100.3 L **7 Claims**



1. A sensing device for use in association with a motion picture projector for projecting motion picture film of the type having a sequence of picture frames, and a sound track on one side margin thereof only, said sound track having at least two separate sound channels thereon side by side with one another and said projector having a single light source for illuminating the whole of said sound track, said device comprising;

a base portion adapted to be fastened to a suitable portion of said motion picture projector;

a moveable support member connected to said base portion;

a stem portion on said support member; threaded recess means therein, and a threaded screw member extending through a hole in said base portion and engaged in said recess means; spring means extending between said base portion and said support member;

stop means for checking excessive movement of said support member relative to said base portion;

adjustable mounting plate means on said support member;

rotatable threaded adjustment means extending between said mounting plate means and said support member, rotation of said adjustment means moving said plate means relative to said support member to move said plate means towards and away from said motion picture film;

at least two light responsive signal generating units mounted on said adjustable mounting plate means side by side with one another, and spaced apart from one another by a distance such that each said unit registers with a respective said sound channel on said track each said signal generating unit being capable of responding to said single light source illumination through both said channels simultaneously, and,

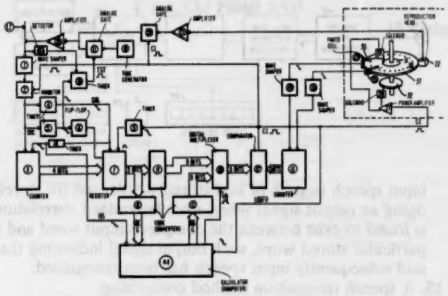
said support member and said mounting plate means being adjustably moveable as aforesaid whereby respective said light responsive signal generating units may be simultaneously oriented in registration with respective said sound channels for receiving light passing therethrough from said common light source, whereby each said unit may generate separate signals in response to illumination of its said separate sound channel without responding to illumination of the remainder of said sound track by said common light source.

4,087,635

METHOD OF AND SYSTEM FOR CARRYING OUT CALCULATIONS BY MEANS OF A TELEPHONE SET

Tulio Vasquez, Carrera 43-A 30-91, Medellin, Colombia

Filed Jan. 10, 1977, Ser. No. 757,953
Int. Cl.[2] H04M *11/00*
U.S. Cl. 179—2 DP **7 Claims**



1. A method of calculation comprising the steps of:

communicating with a calculator or computer via a telephonic link by dialing a predetermined telephone number from a telephone;

entering numbers and operational codes sent from the telephone via the telephonic link into the calculator or computer, and verifying said numbers and codes by means which reproduce corresponding voice representations of the numbers and codes in the earphone of the telephone;

interpreting different pauses between said numbers and said codes by control means which cause the calculator or computer to interprete them adequately for a calculation, which it is to perform; and

comparing calculating results digit by digit, including operational codes, with sequences produced by a voice signal reproduction means which produces a voice signal representation of said calculation results which is applied via an amplifier to the telephonic link and reproduced at the earphone of the telephone.

4,087,636

TRANSMIT-RECEIVE CIRCUIT CHANGING SWITCH SYSTEM

Masaki Akiyama, and Okie Tani, Tokyo, Japan, assignors to Tani Denki Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 21, 1976, Ser. No. 688,911
Claims priority, application Japan, May 28, 1975, 50-64671; Jun. 19, 1975, 50-74720; Jun. 24, 1975, 50-77671
Int. Cl.[2] H04Q *7/04*
U.S. Cl. 179—2 EA **6 Claims**

1. A transmit-receive circuit changing switch system for a radio-telephone equipment comprising:

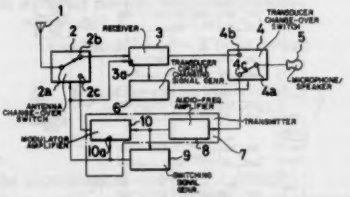
a radio-telephone transmitter having a first control signal input, an audio input, and an output;

a radio-telephone receiver having a second control signal

input, an input for receiving radio-frequency energy, and an output for supplying an audio signal;

antenna change-over switching means having a third control signal input, an antenna being connectible to said antenna change-over switching means, said antenna change-over switching means being selectably connectible to said receives and said transmitter, respectively;

switching signal generator means having an input for a low-frequency control signal and an output for generating a transmit-receive circuit changing signal of a rectangular waveform from the low-frequency signal, the output of said switching signal generator means being connected to each of said control signal inputs, electroacoustic transducer means selectively connectable as a speaker or a microphone, and wherein the low-frequency signal is generated by said transducer means while in the microphone mode and is transmissible to the input of the switching generator means, the presence of said transmit-receive circuit signal on the first control signal input enables the operation of said transmitter, the absence of said transmit-receive circuit signal disables the operation of said transmitter, the presence of the transmit-receive circuit changing signal on the second control input disables the operation of said receiver, the absence of the transmit-receive signal enables the operation of said receiver, the transmit-receive circuit changing signal being input to said third control input of said antenna change-over switching means for connecting the antenna to the output of said transmitter, wherein the absence of the transmit-receive circuit changing signal connects the antenna to the input of the receiver; and means for selectively connecting said transducer means comprising;



means for selectively connecting said transducer to said output of said receiver to act as a speaker and to said transmitter audio and said switching generator means input to act as a microphone; said transducer being the source of the low-frequency signal; and

means for generating a transducer circuit changing signal by detecting the radio-frequency energy input to said receiver, means for generating the transducer circuit changing signal to control said transducer change-over switching means, said transducer being connectible as a microphone by the absence of the transducer circuit changing signal, and as a speaker by the presence of said transducer circuit changing signal.

4,087,637

PACER PULSE WIDTH SIGNALING SYSTEM FOR TELEPHONIC COMMUNICATION

Ervin Christopher DeKont, Plantation, Fla., assignor to ESB Incorporated, Philadelphia, Pa.

Filed Sep. 8, 1976, Ser. No. 721,299
Int. Cl.[2] H04M *11/00*; A61B *5/02*
U.S. Cl. 179—2 A **12 Claims**

1. In a system for monitoring the operation of an implanted organ pacer via a telephonic communication link, means for producing an acoustically transmittable signal representing the width of pacer pulses, comprising:

a pickup stage for detecting a pacer pulse and outputting an electrical pulse signal in response thereto;

a current source;

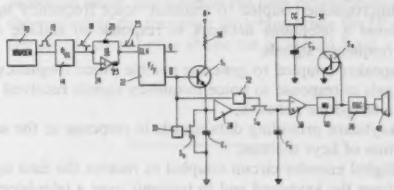
a first capacitor;

first switching means coupled to said current source and said first capacitor and responsive to signals from said pickup stage for controlling the accumulation of charge on said first capacitor;

a second capacitor;

second switching means for coupling said first and said second capacitors;

means for operating said second switching means subsequent to the operation of said first switching means to allow said second capacitor to charge to a potential representative of



the potential on said first capacitor, and to thereafter electrically isolate said second capacitor from said first capacitor;

third switching means coupled to said first capacitor;

means for operating said third switching means subsequent to the operation of said second switching means to substantially discharge said first capacitor; and

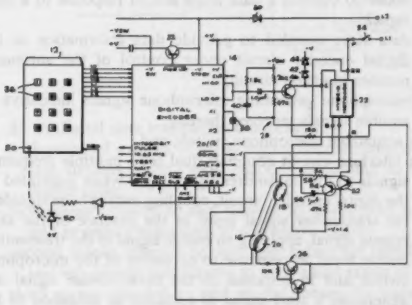
voltage controlled pulse generator means coupled to said second capacitor and responsive to voltage accumulated upon said second capacitor to output a train of pulses representative of the voltage accumulated upon said second capacitor.

4,087,638

DTMF COMMUNICATION SYSTEM

James Christopher Hayes, Irvine, and Burton Ralph Tunzi, Santa Clara, both of Calif., assignors to Telaris Telecommunications Inc., Newport Beach, Calif.

Filed Oct. 1, 1976, Ser. No. 728,725
Int. Cl.[2] H04M *11/00*
U.S. Cl. 179—2 E **66 Claims**



1. A dual tone multiple frequency encoder system comprising:

a keyboard providing data signals indicative of actuated keys;

a data store providing data signals indicative of data characters when addressed;

an encoder circuit coupled to receive sequential data signals from the keyboard and the data store and for each data signal to generate a dual tone multiple frequency signal indicative thereof;

an automatic number insertion circuit coupled to be opera-

tive upon receipt of a start signal to sequentially address the data store to generate a plurality of sequential data characters and to inhibit response of the encoder circuit to keyboard data signals only until after said plurality of sequential data characters from the data store have been generated and encoded as dual tone multiple frequency signals;

a start signal circuit coupled to generate a start signal in response to a keyboard key actuation.

32. A dual tone multiple frequency communication sytem comprising

a switch coupling the system to a telephone network;

a microphone coupled to transmit voice frequency signals over a telephone network in response to audible voice frequency signals;

a speaker coupled to generate audible voice frequency signals in response to voice frequency signals received over a telephone network;

a keyboard providing data signals in response to the actuation of keys thereon;

a digital encoder circuit coupled to receive the data signals from the keyboard and to transmit over a telephone network dual tone multiple frequency signals indicative of actuated keys, the digital encoder circuit including means for generating a first signal when a dual tone multiple frequency signal is being generated and means for generating a second signal when a dual tone multiple frequency singal is being generated and for a period of time thereafter;

a muting circuit coupled to reduce the magnitude of audio signals from the speaker in response to a first signal; and

a microphone circuit coupled to block signals from the microphone during the generation of a dual tone multiple frequency signal by the digital encoder circuit and for a period of time thereafter in response to the second signal.

45. A dual tone multiple frequency communication system comprising:

a radio transmitter coupled to transmit audio frequency signals applied to a signal input when enabled by application of an enable signal to an enable input;

a digital encoder circuit generating dual tone multiple frequency signals in response to data input signals and generating a slow release signal that becomes active upon receipt of a data input signal and remains active for a period of time following a last data input signal, the digital encoder to control a data store and in response to a start signal;

a data store coupled to provide data information to the digital encoder circuit under control of the automatic number insertion circuit;

a microphone generating microphone signals indicative of audible signals received thereby;

an actuatable microphone switch; and

an interface circuit coupling dual tone multiple frequency signals to the transmitter signal input when generated by the digital encoder circuit, coupling microphone signals to the transmitter signal input in the absence of the slow release signal, applying an enable signal to the tramsmitter enable input in response to actuation of the microphone switch and in response to the slow release signal and generating a start signal in response to actuation of the microphone switch.

58. A dual tone multiple frequency communication system comprising:

a data unit coupled to provide a sequence of data signals to a digital encoder circuit in response to operator commands; and

a digital encoder circuit coupled to digitally synthesize a dual tone multiple frequency signal corresponding to each data signal, the digital encoder circuit including means for generating an interdigit pulse signal that is coupled to the data unit and indicates completion of each dual tone multiple frequency signal.

61. A dual tone multiple frequency communication system comprising:

means for providing data signals; and

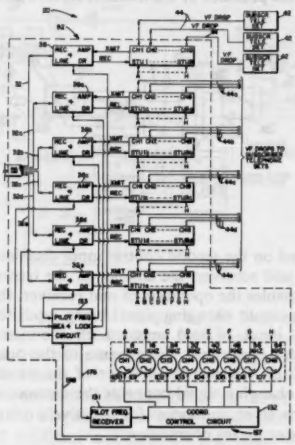
a digital encoder circuit coupled to receive the data signals and including a digital waveform synthesizer coupled to digitally synthesize dual tone sinewave signals at frequencies indicative of the data signals, each sinewave signal being synthesized for a minimum period of time notwithstanding earlier termination of a data signal for which a sinewave signal is generated.

4,087,639

AMPLITUDE MODULATED TELEPHONE CARRIER SYSTEMS

Gerald Wayne Beene, Arlington, and Robert P. Cates, Hust, both of Tex., assignors to Reliance Telecommunication Electronics Company, Euless, TX

Filed Jan. 28, 1977, Ser. No. 763,607
Int. Cl.² H04J *1/12*
U.S. Cl. 179—2.5 R **30 Claims**



1. A plural channel amplitude modulated telephone carrier system comprising a transmission line, a plurality of transmitters to provide for the transmission of a like plurality of amplitude modulated carrier signals of different pre-selected frequencies in a common direction over said transmission line to a remote termination of said line, and automatic carrier level coordination control means comprising first circuit means at the end of the transmission line remote from said termination for developing d.c. control signal that varies as a function of the length of said transmission line, and second circuit means connected between said first circuit means and each of said transmitters for controlling the transmit power level of each of said carrier signals as a function of its own carrier frequency and as a function of said control signal.

4,087,640

DATA INPUT CONTROL SYSTEM

Kazuyuki Sato, Green Heim Koganei, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan

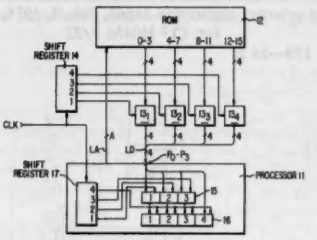
Filed Aug. 17, 1976, Ser. No. 715,141
Claims priority, application Japan, Aug. 21, 1975, 50-101497
Int. Cl.² H04J *3/04*
U.S. Cl. 179—15 A **4 Claims**

1. A data input control system for reducing the number of terminals required by a processor without reducing the functionality of said processor comprising:

a control storage means for storing control data integrated on a one-chip semiconductor device,

a processor means integrated on another one-chip semiconductor device having input terminals for receiving said control data,

means for generating a clock pulse,



gating means for supplying said control data read out from said control storage to said processor means in response to said clock pulse,

means for controlling said gating means on a time-division basis satisfying the following relationships

$$A < T < B, T \times n = B, \ (n; \text{ an integer})$$

$$\frac{D}{n} = \left\{ \begin{matrix} C; \text{ (if there is not any remainder)} \\ C\text{-}1; \text{ if there is a remainder)} \end{matrix} \right\}$$

wherein

A is the access time of said control storage;

B is the memory cycle time of said control storage;

C is the number of control data input terminals of said processor;

D is the bit length of said control data;

n is the number of division times of said control data in said memory cycle time B; and,

T is the period of said clock pulse;

means for storing said control data in said processor in synchronization with the operation of said control means, and

means for accessing said control storage means in order to read said control data.

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NOISE LIMITING CIRCUIT FOR FM STEREO RECEIVER

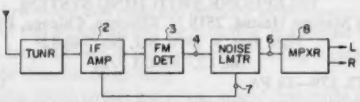
Yoshiro Sugai, Kawagoe, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Mar. 29, 1977, Ser. No. 782,581

Claims priority, application Japan, Apr. 1, 1976, 51-39625[U]; Jul. 14, 1976, 51-93630[U]

Int. Cl.² H04H 5/00

U.S. Cl. 179—15 BT **8 Claims**



1. A noise limiting circuit for an FM stereo receiver including, in series, a tuner circuit, an intermediate frequency (IF) amplifier circuit, an FM detector or demodulator circuit, and a multiplexing circuit, comprising:

(a) a filter circuit for passing high frequency signal components connected between the detector circuit and the multiplexing circuit.

(b) a transistor switch for coupling the output of the filter circuit to ground.

(c) threshold switching means responsive to an output from the IF amplifier circuit, and

(d) time delay means connected between the output of the threshold switching means and the transistor switch for rapidly turning the latter on in response to an output from the threshold switching means and for delaying the turn-off of the transistor switch, whereby the switching means renders the transistor switch rapidly conductive when the IF amplifier circuit output falls below the threshold level to thereby ground high frequency signal components and any pilot signal appearing in the detector circuit output, whereby the receiver output transfers from a stereo to a monaural mode, and wherein the time delay means delays the turn-off of the transistor switching when the IF amplifier circuit output rises above the threshold level.

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DIGITAL DATA COMMUNICATION SYSTEM

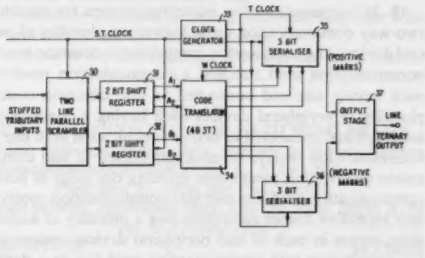
Anthony Jessop, Harlow, and John Richard Dawson, Ipswich, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Continuation of Ser. No. 686,630, May 14, 1976, abandoned, which is a continuation-in-part of Ser. No. 545,458, Jan. 30, 1975, abandoned. This application Mar. 22, 1977, Ser. No. 780,203

Claims priority, application United Kingdom, May 7, 1974, 20035/74

Int. Cl.² H04J 3/00

U.S. Cl. 179—15 BM **27 Claims**



15. A digital data transmitter comprising:

a plurality of sources of serial digital data streams, each of said streams having data encoded according to a first digital code;

first means coupled to said sources to select from each of said streams a sub-group of successive digits;

second means coupled to said first means for transferring said sub-groups collectively to form a first group of digits;

third means coupled to said second means for translating said first group of digits into a second group of digits encoded according to a second digital code different than said first code; and

fourth means coupled to said third means for transmitting said second group of digits;

said first means including

a plurality of shift registers, each of said shift registers having a different one of said streams coupled thereto in serial form, each of said shift registers having a number of stages equal to the number of digits in the associated one of said sub-groups.

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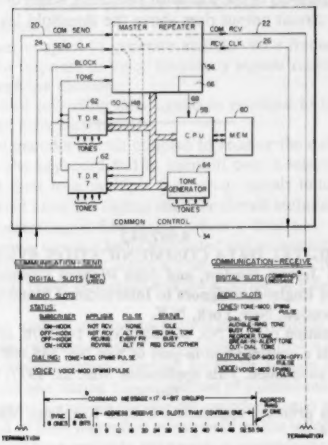
TIME DIVISION MULTIPLEXED PABX COMMUNICATION SWITCHING SYSTEM

David L. Joslow, Chester, Conn.; Alan Bloch, New York, N.Y.; Lincoln Henthorn, and Harold M. Straube, both of Chester, Conn., assignors to Chestel, Inc., Chester, Conn.

Continuation of Ser. No. 665,551, Mar. 10, 1976, abandoned.
This application Jun. 13, 1977, Ser. No. 806,083
Int. Cl.[2] H04J *3/12*
U.S. Cl. 179—15 AL 18 Claims



15. In a communication switching system for establishing two-way communication paths between a plurality of peripheral devices, the combination comprising: a common control, a communication send line and a communication receive line each having one end connected to said common control, a plurality of peripheral devices each having a communication send terminal connected to said communication send line and a communication receive terminal connected to said communication receive line, means time dividing the usage of both said communication send line and said communication receive line into repetitive frames each including a plurality of audio time slots, means in each of said peripheral devices assigning it to transmission on said communication send line in a dedicated one of said audio time slots, means in each peripheral device providing an audio signal, means in each peripheral device for producing pulses modulated by said audio signal and for injecting said modulated pulses into its said dedicated one of said audio time slots for transmission over said communication send line and said communication receive line to other of said peripheral devices, means in each peripheral device for extracting from said communication receive line the modulated pulses appearing in a given audio time slot and for demodulating such extracted pulses to recreate the audio signal which modulated them, means in each peripheral device for varying the frame-by-frame pattern by which said modulated pulses are injected or not injected for transmission in its said dedicated one of said audio time slots in accordance with the conditions of parts of said peripheral device, and means in said common control for inspecting the pattern of the frame-by-frame appearance of pulses in the audio time slot dedicated to each of said peripheral devices on said communication send line and for utilizing such information in establishing and disestablishing communication paths between said peripheral devices.

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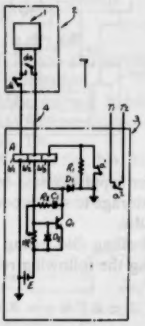
DIAL IMPULSE RELAY CIRCUIT

Fumikazu Hamatani, Kawasaki, Japan, assignor to Nippon Tsu Shin Kogyo K.K., Kawasaki, Japan and TIE/Communications, Inc., Stamford, Conn.

Filed Sep. 21, 1976, Ser. No. 725,283
Claims priority, application Japan, Feb. 2, 1976, 51-10172
Int. Cl.[2] H04M *3/22*
U.S. Cl. 179—16 E 2 Claims



1. A dial impulse repeating circuit comprising

a relay that is connected to a pulse generating circuit, said relay having a make contact which closes when current flows in said pulse generating circuit and which repeats dial impulses applied to said pulse generating circuit to a second circuit connected to said make contact, said relay having a first and second winding connected in series with said pulse generating circuit such that their respective magnetic fluxes are additive, and having a third winding,

direct-current power source means for applying current to said third winding for generating magnetic flux in a direction the same as the magnetic flux generated in said first and second windings when said current is supplied from said pulse generating circuit to said first and second windings, and

a switching circuit interposed between said direct current power source means and said third winding, said switching circuit cutting off current flow through said third winding in response to the cessation of current flow in said pulse generating circuit, said switching circuit allowing current to flow through said third winding in response to the beginning of current flow in said pulse generating circuit, said switching circuit having means for adjusting the time interval between the cessation of current flow in said pulse generating circuit and the cessation of current flow through said third winding.

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TELEPHONE SWITCHING SYSTEM

Alfred Magnus Hestad, 2518 N. Kilbourn, Chicago, Ill. 60639

Filed Dec. 9, 1976, Ser. No. 748,825
Int. Cl.[2] H04M *3/22*
U.S. Cl. 179—18 FA 13 Claims

1. A telephone switching system for interconnecting telephone equipment to complete communication paths therebetween,

said equipment including subscriber stations,

line circuits connected to each of said subscriber stations,

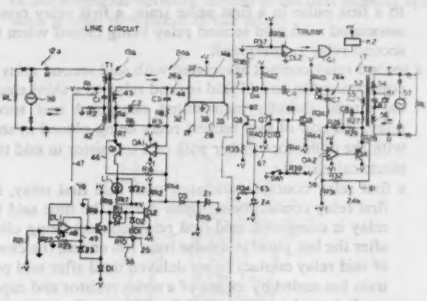
switching matrix means to selectively interconnect circuits connected to the inputs and outputs of said switching matrix means,

means in said line circuits including line transformers having primary windings on said subscriber station side of said line circuits and secondary windings on said switching

matrix side of said line circuits for connecting said line circuits to said switching matrix means,

variable impedance means in series with said secondary windings, and

amplifier means in said line circuits connected to control the variable impedance means responsive to signals going



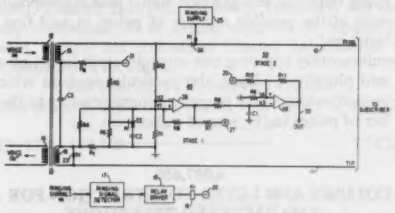
from said subscriber stations to said switching matrices and from said switching matrices to said subscriber stations for decreasing the amplitude of the signals going to said matrix means, while said amplifier means increases the amplitude of the signals going to said subscriber stations.

4,087,646

DUAL MODE TELEPHONE SUBSCRIBER LOOP CURRENT DETECTOR

Stephen Joseph Brolin, Livingston; Richard Joseph Lisco, Whippany, and Mark Thomas Manfred, Rockaway, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 28, 1977, Ser. No. 763,288
Int. Cl.² H04Q *9/00*; H04M *3/00*
U.S. Cl. 179—18 FA **4 Claims**



1. A dual mode telephone loop current detector for detecting, in a first mode, dial pulse and off-hook loop currents in the absence of ringing signals and for detecting, in a second mode, off-hook loop currents in the presence of ringing signals, said dual mode detector comprising

a detector input circuit including, in said first mode, a balanced bridge circuit, and including, in said second mode, a ringing signal bypass circuit,

first and second stages of detection connected serially to said input circuit, each stage being responsive to signals exceeding a respective preselected threshold,

delay means interconnecting said first and second stages and having a delay substantially less than the duration of said dial pulsed current, and

switching means responsive to a ringing control signal for switching said input circuit from said first to said second mode.

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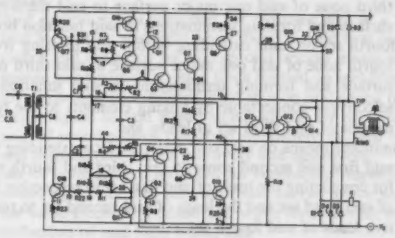
CIRCUIT FOR SUPPLYING DIRECT CURRENT TO TELEPHONE STATION SETS

Milton Luther Embree, Reading, Pa., and John Francis O'Neill, Boulder, Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 25, 1977, Ser. No. 800,220
Int. Cl.² H04M *19/08*
U.S. Cl. 179—77 **10 Claims**



6. A power supply system for a local telephone line circuit comprising

(1) a telephone line circuit including a TIP conductor and a RING conductor,

(2) a first circuit connected between one terminal of a direct current source and one conductor of said telephone line circuit,

(3) a second circuit connected between the other terminal of a direct current source and the other conductor of said telephone line circuit,

(4) said first and said second circuit each including:

(a) a current drive amplifier having an input node and a driver transistor,

(b) an output coupling between said driver transistor and one of said telephone lines, and

(c) resistive feedback coupling between said one telephone line and said input node, and

(5) capacitive connecting means between said input nodes.

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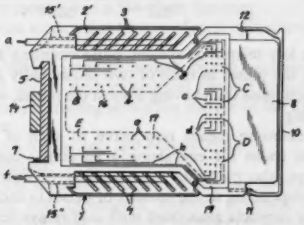
MODULAR CONNECTOR FOR SWITCHING FRAME

Guglielmo Giacoppo, Milan, Italy, assignor to Societa Italiana Telecomunicazioni SIEMENS S.p.A., Milan, Italy

Filed Dec. 17, 1976, Ser. No. 751,890
Claims priority, application Italy, Dec. 19, 1975, 30491 A/75
Int. Cl.² H04Q *1/02*
U.S. Cl. 179—98 **14 Claims**



1. A modular connector for selectively interlinking incoming and outgoing lines of a communication system, comprising:

a generally prismatic housing with two major surfaces interconnected by a first, a second and a third minor surface;

a bank of input terminals extending from said housing at said first minor surface;

a bank of output terminals extending from said housing at said second minor surface;

a junction box secured to said housing at said third minor surface;

a first set of leads extending within said housing from said input terminals and emerging in a first zone of one major surface thereof;

a second set of leads extending within said housing from said output terminals and emerging in a second zone of said one major surface;

a third set of leads extending within said housing from a third zone of said one major surface to said third minor surface and forming terminations in said junction box;

a fourth set of leads extending within said housing from a fourth zone of said one major surface to said third minor surface and forming terminations in said junction box selectively connectable by linking elements to the terminations of said third set of leads; and

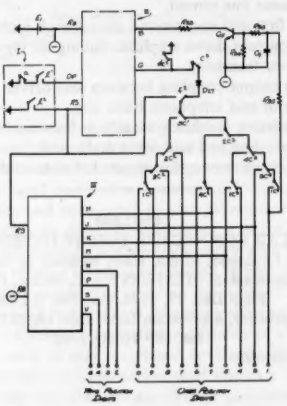
conductor means on said one major surface extending from said first and second zones to said third and fourth zones for connecting the leads of said first set to respective leads of said third set and the leads of said second set to respective leads of said fourth set.

4,087,649

PULSE COUNTING CIRCUIT

Stephen E. Kerman, Merrick, N.Y.; Fumikazu Hamatani, Kawasaki, and Fumio Tsutsumi, Takasaki, both of Japan, assignors to Nippon Tsu Shin Kogyo K.K., Kawasaki, Japan and TIE/-Communications, Inc., Stamford, Conn.

Filed Sep. 21, 1976, Ser. No. 725,110
Int. Cl.[2] H04M 1/72
U.S. Cl. 179—99 **2 Claims**



1. In a key telephone system, pulse counting apparatus for counting the pulses in each of two sequentially applied pulse trains, each pulse train having at most ten pulses, said apparatus comprising

relay counting means responsive to each of said applied pulse trains for energizing a particular combination of relays, the particular combination of energized relays corresponding to the number of pulses in each pulse train, relay contacts associated with said relays being arranged to generate a signal on only one of a plurality of leads, each of the leads corresponding to one number of the number of pulses in a pulse train,

memory circuit means, responsive to the particular signal on one of said plurality of leads corresponding to the number of pulses counted for the first pulse train, for enabling a particular storage element corresponding to the number of pulses in said first pulse train,

resetting means for resetting said relay counting circuit means to zero count if the first pulse train applied to the counting apparatus contains only one pulse, the resetting means having

a first relay, part of said relay counting circuit means, energized by a first electrical circuit means in response to a first pulse in a first pulse train,

a second relay, also part of said relay counting circuit means, energized by a second electrical circuit means in response to a first pulse in a first pulse train, a first relay contact associated with said second relay being closed when said second relay is energized,

a second relay contact associated with said second relay for connecting the coil of said second relay to a third electrical circuit thereby maintaining energized said second relay, the coil of said second relay being placed in series with the collector-emitter path of a transistor in said third electrical circuit,

a first relay contact associated with said first relay, said first relay contact being open during the time said first relay is energized, said first relay contact being closed after the last pulse in a pulse train has ended, the closing of said relay contact being delayed until after said pulse train has ended by means of a series resistor and capacitor being placed in parallel with said first relay, the values of the resistance of said resistor and the capacitance of said capacitor being selected such that the resistance-capacitance product is a time constant shorter than the interdigital pause between pulse trains but longer than the break time between pulses in a pulse train,

a fourth electrical circuit means in series with said first relay contact associated with said second relay created by the closing of said first relay contact associated with said first relay for generating a control signal and applying said control signal to the base of said transistor thereby cutting off said collector-emitter path of said transistor and returning said second relay to a released state,

circuit means responsive to said relay counting means and said memory circuit means for generating a final signal when two pulse trains have been received and counted,

circuit means responsive to said final signal for

applying one first output signal from said memory circuit means onto a particular tens-position signal lead there being only one tens-position signal lead corresponding to each of the possible number of pulses in said first pulse train, and

simultaneously applying one second output signal on one of said plurality of leads, the particular lead on which the second output signal is applied corresponding to the number of pulses in the second pulse train.

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COLUMN AND LEVER CONSTRUCTION FOR A CHARACTERED TELEPHONE

Council A. Tucker, Los Angeles, Calif., assignor to American Telecommunications Corporation, El Monte, Calif.

Filed Nov. 19, 1976, Ser. No. 743,116
Int. Cl.[2] H04M 1/02
U.S. Cl. 179—100 D **15 Claims**

1. A column construction for a telephone that is partially encased by a fanciful figure comprising:

(a) a base housing adapted to receive a telephone network and having a hook switch;

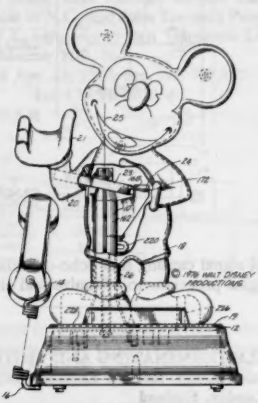
(b) a column attached to the base housing and extending upwardly therefrom;

(c) a pivot bracket attached to the column by attachment means and extending laterally and away from one side of the column on the outside of the column;

(d) a lever pivotally secured to the pivot bracket at a location laterally away from the longitudinal centerline of the column, the lever extending laterally away from the column on the diametric opposite side from its pivotal mounting and having a section on the opposite side of the pivot

which is adapted to attach an appendage of the figure, which appendage cradles and supports a telephone handset;

(e) an actuator engaged by the lever for movement in response to pivotal movement of the lever toward the base housing to a lower position when the handset is placed on the lever, the actuator being adapted to engage the switch of the telephone network housed in the base housing upon such pivotal movement of the lever;



(f) means biasing the actuator away from the base housing and into an upper position when the handset is off the lever; and

(g) means to attach the figure to the column with the column covered by the figure;

whereby, the appendage moves through a small arc for its total movement during the pivoting of the lever.

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OPTICAL SOUND RECORDING SYSTEM WITH INVERSELY POLARIZED SOUND SIGNALS

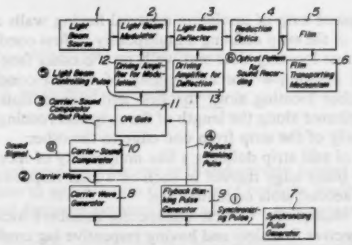
Teiichi Taneda, Kawasaki; Yukio Sugiura, Tokyo; Toshio Motoki, Yamato; Hiroyuki Miyatera, Yokosuka, and Goichi Oishi, Yokohama, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo and Yokohama Cinema Laboratories Inc., Yokohama, both of, Japan

Filed Feb. 22, 1977, Ser. No. 770,652

Claims priority, application Japan, Feb. 24, 1976, 51-19256

Int. Cl.[2] H04N *5/84;* **G11B** *7/02*

U.S. Cl. 179—100.3 R **17 Claims**



1. An optical sound recording system, wherein a light beam gated in intermittent durations corresponding to momentary amplitudes of a sound signal at a high frequency beyond audible range is deflected in a direction crossing a transporting direction of a film transported continuously at said high frequency and is recorded on said film, comprising

(1) a sound signal source,

(2) a carrier wave signal source,

(3) a deflection signal source for providing a deflection signal,

a light source provided for generating said light beam,

a first optical means provided for gating said light beam periodically,

a second optical means provided for deflecting said light beam gated by said first optical means in said direction and at said high frequency under control of said deflection signal,

a third optical means provided for reducing size of a light spot formed by said light beam gated by said first optical means and deflected by said second optical means in response to a width of a sound track formed on said film and for projecting said reduced light spot on said sound track,

means coupled to said sound signal source for providing a pair of sound signals polarized oppositely to each other and respectively biased positively and negatively,

a pair of comparators provided for comparing respectively sound signals of said pair with said carrier wave having the same frequency, phase and wave form to that of the deflection of said light beam, and

an amplifier provided for amplifying and applying output signals derived from said pair of comparators to said first optical means as driving signals.

4,087,652

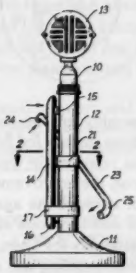
MICROPHONE SWITCH KEY

Don J. Hirsch, 670 N. Cambridge, Orange, Calif. 92667

Filed May 9, 1977, Ser. No. 795,285

Int. Cl.[2] H04M *1/04;* **H01H** *21/10*

U.S. Cl. 179—147 **1 Claim**



1. An microphone key switch assembly comprising in combination:

a microphone stand, said stand having a cylindrical support structure mounted at a 90° angle thereon;

a microphone mounted at the top of such cylindrical support structure;

an on-off button pressure switch biased permanently off mounted within such cylindrical support structure with the button protruding above the surface of the cylindrical structure;

a switch arm having top and bottom ends;

a spring member;

a first circular support collar fastened to said switch arm and encircling said cylindrical support structure and said switch arm trapping the spring member between the cylindrical support structure and the bottom end of the switch arm so that the top end of the arm is just in engagement with the switch button;

a U-shaped key with an opening passing through it parallel to the legs of the U and located so that the distance from the center of the opening to the farthest end of one leg is at least two times the distance from the center of the opening to the farthest end of the shorter leg;

fastener means one end of which engages the U-shaped key

the other end passes through said opening in said U-shaped key and protrudes above said opening;

a second circular support collar attached to the protruding end of said fastener and encircling the cylindrical support member and located above the first circular support bracket so that the shorter leg of the U is in engagement with the top of the switch arm and the longer leg is above the microphone stand and extended away from the cylindrical support structure;

slight pressure by the finger or thumb against said longer leg forcing the shorter leg to co-act with the switch arm to turn the microphone on and by the release of such pressure the parts return to their original off mode.

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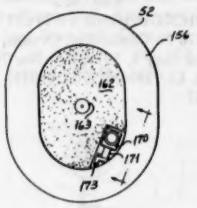
SOUND ATTENUATING EARCUP ASSEMBLY PROVIDED WITH RECEIVERS AND CONTACT MICROPHONE

Leonard P. Frieder, Jr., Dalton, and Jackson A. Aileo, Carbondale, both of Pa., assignors to Gentex Corporation, Carbondale, Pa.

Division of Ser. No. 641,450, Dec. 17, 1975, Pat. No. 4,023,209. This application Nov. 5, 1976, Ser. No. 739,266

Int. Cl.[2] H04M *1/05;* H04R *1/10*

U.S. Cl. 179—156 R **12 Claims**



1. In an earphone assembly for two-way voice communication including an earphone, means for fitting said earphone in relatively close adjacent relationship with an ear of a wearer, and a contact microphone, the improvement comprising means for urging said contact microphone against the head of the wearer in the region of said earphone and manually operable means carried by said assembly for alternatively disabling said contact microphone while enabling said earphone or disabling said earphone while enabling said contact microphone.

4,087,654

ECHO CANCELLER FOR TWO-WIRE FULL DUPLEX DATA TRANSMISSION

Kurt Huggo Mueller, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 28, 1975, Ser. No. 636,297

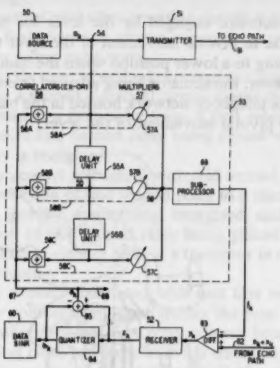
Int. Cl.[2] H04B *3/24*

U.S. Cl. 179—170.2 **9 Claims**

1. An echo canceller for digital data transmission systems including terminals having both a transmitter section and a receiver section for simultaneous two-way signaling at full bandwidth over a common two-wire signal path comprising at each terminal

an adjustable signal processor for synthesizing an echo-cancellation signal having its input connected to a data symbol source preceding the transmitter section for an outgoing signal toward said two-wire signal path and its echo-cancelling output signal connected in subtractive relationship with the incoming signal over said two-wire signal path from a remote terminal to form a substantially echo-free signal for said receiver section and

means responsive to the error difference between quantized and actual outputs of the receiver section for generating a



control signal causing said echo-cancellation signal from said signal processor to minimize said error difference.

4,087,655

CABLE TERMINATING AND TESTING UNIT

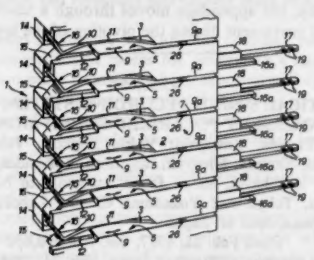
Alan William Massey, Radlett, England, assignor to The Post Office, London, England

Filed Mar. 8, 1976, Ser. No. 665,114

Claims priority, application United Kingdom, Mar. 12, 1975, 10366/75

Int. Cl.[2] H04M *3/22;* H01R *9/08*

U.S. Cl. 179—175 **11 Claims**



1. An element for a terminating and testing unit suitable for use in a telecommunications exchange, said element comprising:

a one-piece strip of insulating material having walls on one face of the strip defining a multiplicity of first conducting member locating slots and walls on the other face of the strip defining a like multiplicity of second conducting member locating slots, the first and second slots being distributed along the length of the strip and running transversely of the strip from one edge to the other;

a part of said strip defining a like multiplicity of recesses in said other edge thereof in each of which respective first and second slots communicate,

a like multiplicity of first conducting members located in respective first slots and having respective tag connection portions projecting from said one edge of the strip,

a like multiplicity of second conducting members located in respective second slots and having respective tag connection portions projecting from said one edge of the strip,

a like multiplicity of first socket portions provided on respective first conducting members and located in respective recesses, and

a like multiplicity of second socket portions provided on

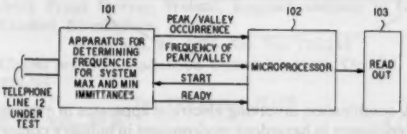
respective second conducting members, located in respective recesses and cooperating with respective first socket portions to define respective sockets at said other edge of the strip.

4,087,656

TESTING OF INDUCTIVELY LOADED TRANSMISSION LINES FOR CORRECT LOADING

Frederick David Blum, Elon College; Donald Larry Hester, Kernersville, both of N.C., and John Terrance Peoples, Berkeley Heights, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 15, 1977, Ser. No. 787,852
Int. Cl.[2] H04B *3/46*
U.S. Cl. 179—175.3 R **6 Claims**



1. Test equipment for use with inductively loaded transmission lines to approximate the values of both the loading inductors and distances between said inductors, said equipment comprising

apparatus for measuring the magnitudes as a function of frequency of the input immittance of a loaded transmission line and for utilizing said magnitudes to produce outputs indicating the approximate frequencies of the poles and zeros of said line, and

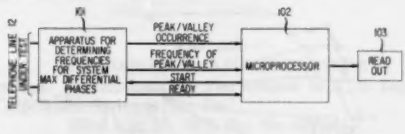
means responsive to the frequency information output of said apparatus to synthesize a ladder network comprising series connected inductors and shunt connected capacitors where the pole and zero frequencies of said network approximate in value those identified by said apparatus and, furthermore, to produce outputs indicative of the values of said inductors and capacitors of said synthesized network.

4,087,657

TESTING OF INDUCTIVELY LOADED TRANSMISSION LINES FOR CORRECT LOADING

John Terrance Peoples, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 15, 1977, Ser. No. 787,847
Int. Cl.[2] H04B *3/46*
U.S. Cl. 179—175.3 R **6 Claims**



1. Test apparatus for use with inductively loaded transmission lines to approximate the values of both the loading inductors and distances between said inductors, said apparatus comprising

apparatus for measuring the immittance phase differentials of the input immittance of a loaded transmission line and for utilizing said differentials to produce outputs indicating the approximate frequencies of the poles and zeros of said line, and

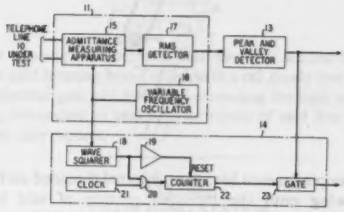
means responsive to the frequency information output of said apparatus to synthesize a ladder network comprising series connected inductors and shunt connected capacitors where the pole and zero frequencies of said network approximate in value those identified by said apparatus and, furthermore, to produce outputs indicative of the values of said inductors and capacitors of said synthesized network.

4,087,658

APPARATUS AND METHOD FOR DETERMINING FREQUENCIES FOR SYSTEM MAXIMUM AND MINIMUM IMMITTANCES

Richard Scott Hoppough, Greensboro, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 15, 1977, Ser. No. 787,849
Int. Cl.[2] H04B *3/46*
U.S. Cl. 179—175.3 R **4 Claims**



1. Apparatus for identifying the local maximum and minimum points in the imittance vs. frequency characteristic of a circuit, said apparatus comprising

first means for connection to said circuit for producing an output representative of the absolute magnitude of the immittance of said circuit as a function of frequency,

second means connected to said first means for detecting the occurrence of local maximum and minimum points in said output, and

third means connected between said first and second means to produce an output indicative of the frequency at the times said maximum and minimum points are detected.

4,087,659

TAMPERPROOF HANDSET FOR RAILROAD APPLICATIONS

Charles A. Boenecke, 1 Capshire Dr., Cherry Hill, N.J. 08003

Filed Jan. 21, 1977, Ser. No. 760,877
Int. Cl.[2] H04R *1/06*
U.S. Cl. 179—186 **8 Claims**

1. A tamperproof handset for use in a system such as a railroad communication system comprising:

a communication handset;

said handset including a transmitter end;

a housing discrete from said handset;

a cable having a plurality of wires;

said cable having one end passing through a hole in said handset in the area of said transmitter end, said cable extending into said handset;

means for securing said cable within said handset;

said transmitter end having threaded outer peripheral surface;

a transmitter cap removably connected to said outer peripheral surface;

means removably locking said transmitter cap to said end;

a bushing having a flange and threaded portion;

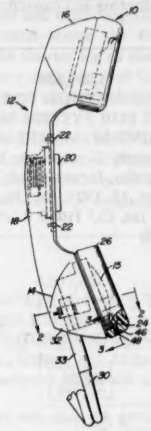
said flange resting on the outer surface of said housing and said threaded portion extending into said housing;

a nut for screwing onto the threaded portion of said bushing and for securing the bushing to the housing;

the other end of said cable passing through a hole in said bushing and extending into the interior of said housing;

clamping means secured to said cable within said housing for

preventing the motion of said cable relative to said clamp means; and



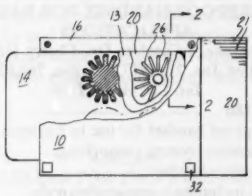
said clamping means having an internal threaded surface for screwing onto the threaded portion of said bushing whereby said clamping means is secured within said housing.

4,087,660

MAGNETIC CARD READER

Bruce S. Sedley, 7 Murray Ave., Larkspur, Calif. 94939

Continuation-in-part of Ser. No. 556,655, Mar. 10, 1975, Pat. No. 3,999,023. This application Jun. 30, 1976, Ser. No. 701,140
The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed.
Int. Cl.[2] H01H *43/08*
U.S. Cl. 235—449 **8 Claims**



1. A magnetic card reader for reading a magnetized data card adapted to be placed in a predetermined position in said reader, said card having magnetizable points arranged in a predetermined arrangement to permit coding said card by magnetizing certain spots at certain of said points, said reader comprising:

a base having a flat side,

a plurality of elongated reed switches supported on said side in coplanar relationship and parallel to said side,

means for positioning said card parallel to the common plane of said reed switches with the magnetizable points of said card in registration with and closely adjacent corresponding ends of said switches whereby the flux of the magnetized spots actuates the switches corresponding to such magnetized spots,

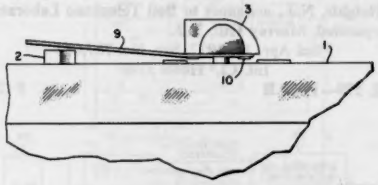
said reed switches being arranged in a circular row and radially disposed relative to a common center.

4,087,661

SWITCH ENCLOSURE FOR HAZARDOUS ENVIRONMENT HAVING COVER REMOVAL INTERLOCKING DEFEATER ASSEMBLY

Gustav Bergson, Cedarbrook Hill Apts., 11, Apt. B-117, Wyncote, Pa. 19095

Filed Oct. 21, 1975, Ser. No. 624,504
Int. Cl.[2] H01H *9/20*
U.S. Cl. 200—50 R **7 Claims**



1. A combination involving electrical apparatus in explosion proof enclosure in hazardous environment in industry comprising:

(a) electrical equipment,

(b) an explosion proof enclosure enclosing that particular electrical equipment and having an explosion proof main casing having an opening for access to the interior and an explosion proof cover member having a closed position in which it closes off the opening and an open position in which access to the interior is permitted, opening of which member is controlled by fastening means,

(c) a hazardous environment located outside of the enclosure relative to the electrical equipment,

(d) a switch having an On position in which the electrical equipment can be in energized status and an OFF position in which the electrical equipment can not be in energized status, and

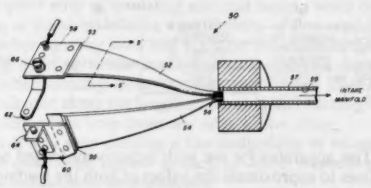
(e) means to prevent the fastening means from being put in a condition where the cover member is open when the switch is in the On position and to permit the fastening means to be put in a condition where the cover member is open when the switch is in the OFF position.

4,087,662

AXIAL TORSION PRESSURE TRANSDUCER

Norman Halem, 3053 Skyline Dr., Cocoa, Fla. 32922

Division of Ser. No. 428,073, Dec. 26, 1973, Pat. No. 3,918,543. This application Oct. 31, 1975, Ser. No. 627,748
Int. Cl.[2] H01H *35/36*
U.S. Cl. 200—81.8 **2 Claims**



1. A device for translating a pressure change into a mechanical motion, said device comprising:

a first flat, flexible member having a sealed end and a hollow core, said flat member defining a twist in a direction axial with said hollow core;

a second flat, flexible member having a sealed end and a hollow core, said flat member defining an axial twist opposite to that of said first flat, flexible member, said sealed end of said second member being disposed in juxta-

posed relation to said sealed end of said one member, whereby pressure changes in said cores cause flexing of said members in said respective axial directions;

a pair of juxtaposed switch contacts, each contact being carried by one of said flexible members at the respective sealed end thereof;

means for adjusting the throw of one of said switch contacts whereby said contacts are adapted to close only upon sensing by said members of a predetermined pressure in the corresponding cores; and

thermal-latching means serially coupled to one of said contacts.

4,087,663

LIQUID LEVEL CONTENTS INDICATORS FOR VEHICLE HYDRAULIC SYSTEMS

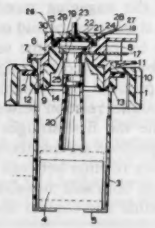
Patrick Frank Sawyer, Walsall, England, assignor to Girling Limited, Birmingham, England

Filed Sep. 24, 1976, Ser. No. 726,118

Claims priority, application United Kingdom, Oct. 28, 1975, 44229/75

Int. Cl.² H01H *35/18*

U.S. Cl. 200—84 R **4 Claims**



1. A liquid level contents indicator for a vehicle hydraulic system comprising spaced contacts of an electric circuit, an electric switch member operative to engage with both contacts and complete the electric circuit, indicating means energised by said electric circuit, means operating said switch member such that the electric circuit is completed when the level of liquid in a reservoir for hydraulic fluid in said system is below a predetermined value, an end closure cap for said reservoir, said closure cap including a hollow housing and a plug closing one end of said housing, a manually operable push button located in said plug for testing said circuit, and a resilient diaphragm clamped at its peripheral edge between said plug and said housing, said diaphragm comprising means acting as a return spring for said button and providing a seal between said plug and said housing.

4,087,664

HYBRID POWER CIRCUIT BREAKER

Donald E. Weston, Lansdale, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Aug. 29, 1975, Ser. No. 609,161

Int. Cl.² H01H *33/14, 33/66*

U.S. Cl. 200—145 **5 Claims**

1. A hybrid circuit breaker comprising in combination:

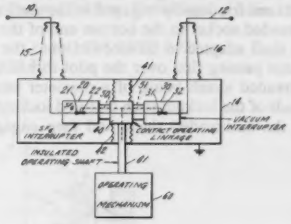
a first circuit interrupter having the interruption characteristics of a vacuum interrupter;

a second circuit interrupter having the characteristics of a sulfur hexafluoride interrupter;

first and second terminals for each of said first and second interrupters; said first and second terminals connected in series with one another;

said second interrupter comprising a pair of cooperable contacts in series with said first and second terminals of said second interrupter, and a housing for receiving said pair of contacts which is filled with sulfur hexafluoride under pressure;

operating means connected to said first and second interrupters for simultaneously operating said first and second interrupters to a circuit interrupting condition;



and a housing for enclosing said first and second interrupters; said housing being filled with a relatively low pressure dielectric gas; and bushings extending through said housing connected to said first terminals of said first and second interrupters.

4,087,665

SWITCHING SYSTEM

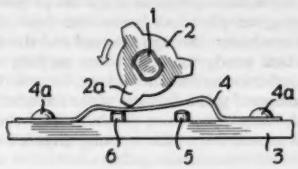
Kojiro Tanaka, Yachiyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Feb. 2, 1976, Ser. No. 654,222

Claims priority, application Japan, Feb. 10, 1975, 50-17287

Int. Cl.² H01H *21/00*

U.S. Cl. 200—153 LB **5 Claims**



1. A switching system comprising: switching means including at least two stationary contact members, a movable contact and means including a rotatable switching member for urging the movable contact into contact with a first and then a second of the two stationary contact members when said switching member is rotated in a first direction and into contact with the second and then the first stationary contact members when said switching member is rotated in a second direction opposite to said first direction; and circuit means having two input terminals connected to the two stationary contact members and two output terminals and responsive to the order in which the first and second stationary contact members are contacted by said movable contact for generating an output signal at only a first of the two outputs thereof when the rotatable switching member is rotated in said first direction and for generating an output signal at only the second of the two outputs thereof when the rotatable switching member is rotated in said second direction.

4,087,666

SWITCH DEVICE FOR PRINTED CIRCUIT BOARD AND CIRCUIT STRUCTURE

Lon DeHaitre, Arlington Heights, Ill., assignor to Abbott Screw & Mfg. Co., Chicago, Ill.

Filed Feb. 2, 1977, Ser. No. 764,819

Int. Cl.² H01B *3/40*

U.S. Cl. 200—158 **23 Claims**

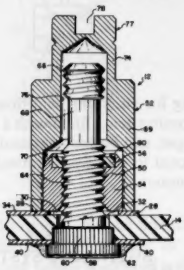
1. A switch device for use in connection with a printed circuit board, the switch device comprising:

A. a stud having a pair of male threaded sections comprising a pilot section and a working section separated by an unthreaded shank, mounting means at one end of the stud adjacent the working threaded section adapted for mounting the stud to a printed circuit board,

B. a hollow shell having a bottom end,

C. a locknut frictionally engaged in the shell and presenting a threaded socket to the bottom end of the shell,

D. the shell adapted to be screwed onto the stud with the locknut passing first over the pilot threaded section, said unthreaded shank being of a diameter smaller than the threads of the locknut such that said locknut moves freely past the unthreaded shank and then engaging upon the



working threaded section, the axial length of the unthreaded shank being greater than the axial length of the female thread of the locknut,

E. the bottom end of the shell, when fully screwed down the working threaded section of the conductive stud, contacting the top surface conductor of the circuit board and thus completing on electrical connection from the bottom surface conductor, through the stud and the shell to the top surface conductor, and when partially unscrewed breaking the connection, the locknut, because of its diameter as compared to the diameter of the threaded sections of the stud, being captured on the shank if the shell inadvertently is moved free of the working threaded section.

4,087,667

DOUBLE-THROW CONTACT

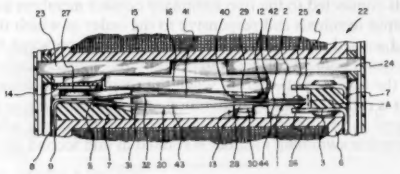
Wolfgang Heider, Lengries; Hans Heiland, Geretsried, and Wolfgang Adalbert Schroetter, Unterhaching, all of Germany, assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Jan. 19, 1976, Ser. No. 650,192

Claims priority, application Germany, Jan. 20, 1975, 2502078

Int. Cl.[2] H01H *1/50*

U.S. Cl. 200—245 **20 Claims**



1. In a double-throw contact assembly for an electrical switching device including first and second fixed contact members disposed in opposed, spaced-apart relation to each other, a movable contact element for making contact alternatively with said first or second fixed contact member, said movable contact element comprising two flexible contact arms, each said arm having a contacting surface at one free end thereof with the other end of each said contact arm being affixed to a fixed clamp support so that said contacting surface is disposed within the space between said first and second fixed contact members, and actuating means for moving said movable contact element, including a member engageable with said contact arms, the improvement wherein each said contact arm comprises:

a fixed arm portion secured against movement by said clamp support between the fixed end of said contact arm and a clamp point spaced from said fixed end along the length of said contact arm, and

a movable arm portion extending from said clamp point to the free end of said contact arm, said movable arm portion including said contacting surface at the free end thereof movable into and out of engagement with one of said fixed contact members,

each said movable arm portion of each said two contact arms including a single bend disposed along its length intermediate said free end and said clamp point to define for each said movable arm portion when in a relaxed state a first straight portion extending angularly from said fixed arm portion at said clamp point to said bend, and a second straight portion extending angularly from said first straight portion at said bend to the free end of said contact arm, the movable arm portions of said two contact arms diverging outwardly from a common line of symmetry directed longitudinally of said contact arms when in a relaxed state, the engaging member of said actuating means placing at least one of said movable arm portions in a tensed state by engaging the second straight portion thereof whereby said second straight portions of the two movable arm portions are maintained in a spaced-apart, substantially parallel relation between said bends and said free ends while the first straight portions of said two movable arm portions are maintained in an opposed, substantially convex relation between said clamp points and said bends when both said movable arm portions are in a tensed state within said contact assembly.

4,087,668

ELECTRICAL CONTACT

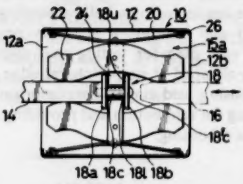
Ryoichi Nakanishi, and Masaru Ito, both of Tokyo, Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Jan. 15, 1976, Ser. No. 649,517

Claims priority, application Japan, Jan. 29, 1975, 50-13251; Feb. 21, 1975, 50-24426; May 19, 1975, 50-67426

Int. Cl.[2] H01H *1/42, 1/50*

U.S. Cl. 200—254 **7 Claims**



1. An electrical contact arrangement comprising fixed and movable conductors, a housing, a plurality of contact elements, a leaf spring for each contact element secured to said housing means mounting said contact elements as a single unit in said housing, including an L-shaped supporting member for each contact element and including two legs, means fixing each said leaf spring on one of the legs of the respective said L-shaped supporting member and a pin pivotably coupling the respective said contact element with the second leg, and means supporting the L-shaped supporting members to provide an arrangement of contacts spaced at fixed intervals and including a member having a cross section with a groove mounted at one end of said fixed conductor, said supporting members being received in the groove such that said movable conductor is movable to be in contact with or away from one of the ends of the contact elements for turning the electrical contact arrangement on or off.

4,087,669

HOUSED ELECTRICAL SWITCH WITH SLIDE FASTENING MEMBERS

Heinrich Sauer, Amberg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 26, 1976, Ser. No. 661,425
Claims priority, application Germany, Mar. 5, 1975, 2509566
Int. Cl.[2] H01H *13/00*
U.S. Cl. 200—340 8 Claims

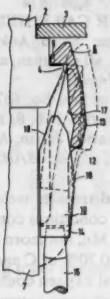


Fig. 1

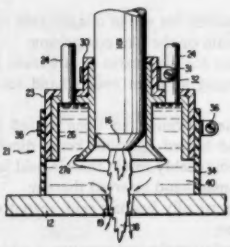
1. In an electric master switch including an actuating member (1) fastened to a mounting wall (3), said actuating member (1) being coupled to a housing (7) containing the switching elements of said switch by means of resilient locking arms (6) disposed in engagement with said actuating member (1), the improvement comprising wedge-shaped slide members (10) slidably disposed between said locking arms (6) and said housing (7) for disengaging said locking arms (6) from said actuating member (1), said slide members being provided with means for matching the frictional forces between said slide members (10) and said locking arms (6), and said slide members (10) and said actuating member (1), respectively, and for returning said slide members (10) to a disengaged position with respect to said locking arms (6) when said housing is disposed on said actuating member (1).

4,087,670

PROCESS FOR SUPPRESSION OF NOISE AND FUMES GENERATED BY PLASMA-ARC CUTTING OPERATION

Samuel L. Miller, Honey Brook, Pa., assignor to Lukens Steel Corp., Coatesville, Pa.

Division of Ser. No. 373,882, Jun. 26, 1973. This application Nov. 6, 1974, Ser. No. 521,406
Int. Cl.[2] B23K *9/00*
U.S. Cl. 219—121 P 23 Claims



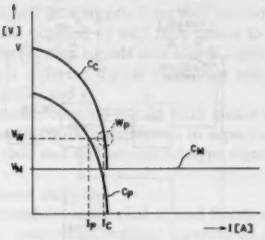
1. In a process wherein metal is removed from a metal workpiece by a hot effluent discharged from a torch, the use of a solid layer of water which is provided so as to surround the space between the hot effluent discharge of said torch and said workpiece and said hot effluent being immersed in and piercing through said layer of water.

4,087,671

DEVICE FOR PLASMA-MIG WELDING

Wilhelmus Gerardus Essers, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,452
Claims priority, application Netherlands, Mar. 19, 1975, 7503241
Int. Cl.[2] B23K *9/00*
U.S. Cl. 219—121 P 4 Claims



1. A device for plasma-MIG welding, which comprises a welding torch including a housing provided with a nozzle to be positioned relative to a workpiece to be welded but out of contact therewith, a non-consumable electrode arranged within the housing out of contact with the workpiece, a contact tube arranged within the housing for supplying a welding wire through the nozzle toward the workpiece but out of contact therewith, means for supplying a plasma gas to the housing and through the nozzle, a first power supply source having a drooping voltage characteristic and connected to the non-consumable electrode, and a second power supply source having a constant voltage characteristic and connected to the contact tube with its associated welding wire for solely maintaining a MIG arc between the welding wire and the workpiece, the first power supply source being connected in series with the second power supply source at a point between such second power supply source and its connection to the contact tube with its associated welding wire for maintaining a plasma arc between the non-consumable electrode and the workpiece.

4,087,672

LASER REMOVAL OF MATERIAL FROM WORKPIECES

Alberto Yi, London, England, assignor to United Kingdom Atomic Energy Authority, England

Filed Jul. 7, 1976, Ser. No. 703,196
Claims priority, application United Kingdom, Jul. 8, 1975, 28722/75
Int. Cl.[2] B23K *27/00*
U.S. Cl. 219—121 LM 9 Claims

1. Apparatus for engraving a printing surface by means of a laser beam which scans said surface, said apparatus including a beam intensity control circuit responsive to a varying image-representing signal to provide a varying beam intensity at said surface and, when the intensity is above an excavation threshold for the material of said printing surface, to cause different amounts of material to be removed from different parts of said surface, said beam intensity control circuit additionally comprising:

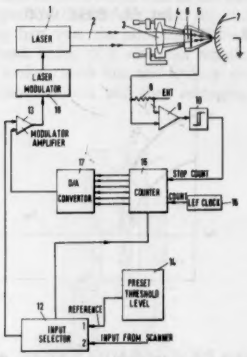
at least one conductive probe positioned in a region of ionisation close to a part of said printing surface from which material is being excavated by means of said laser beam;

a probe circuit in which said probe is connected, said probe circuit passing current when said probe detects ionisation of said material;

means for applying to said beam intensity control circuit a test signal which changes in value during calibration;

calibrating means provided with a reference signal the value of which represents the image signal level which is desired to correspond to the excavation threshold for the material,

said calibrating means operating in a first mode to control the beam intensity in accordance with a progressively changing test signal and operating in a second mode to control the beam intensity jointly in accordance with the image-representing signal and a calibrating signal; and



means responsive to the value of the test signal at the excavation threshold during operation of said calibrating means in the first mode to determine the value of the calibrating signal as a function of the difference between the value of the test signal and the reference signal level.

4,087,673

METHOD OF WELDING AND ELECTRODE THEREFORE

Matt Killunen, Brighton, Mich., assignor to Weld Mold Company, Northville, Mich.

Filed Jun. 11, 1976, Ser. No. 695,281
Int. Cl.[2] B23K *9/24, 35/22*
U.S. Cl. 219—137 WM **7 Claims**

1. A welding electrode capable of depositing weld metal of the composition

Ingredient	from about % to about % by weight
Nickel	60 - 85
Iron	40 - 15
Manganese	1.5 - 5
Carbon	1 - 3
Silicon	0.25 - 2

said electrode comprising an axially extending metallic nickel rod and an enclosing flux coating comprising fluxing ingredients selected from the group consisting of alkaline earth carbonates and fluorides, an alkali metal silicate binder, graphite and a mixture of iron powder and ferromanganese, the iron content of said flux ranging from about 35 to about 60% by weight of the flux, and the flux constituting from about 40 to about 60% by weight of the complete electrode.

2. In a method of welding a workpiece of cast iron to itself or to other metals, the steps of passing an electric current through an electrode of metallic nickel coated with a flux comprising fluxing ingredients selected from the group consisting of alkaline earth carbonates and fluorides, an alkali metal silicate binder, graphite and from about 30 to about 60% by weight of metallic iron present in the flux as iron powder and ferromanganese, and depositing on said workpiece weld metal having the composition:

Ingredient	from about % to about % by weight
Nickel	60 - 85
Iron	40 - 15
Manganese	1.5 - 5
Carbon	1 - 3

-continued

Ingredient	from about % to about % by weight
Silicon	0.25 - 2

4,087,674

STEEL WIRE FOR GAS SHIELDED WELDING

Kazumaru Kohira, Sama; Shiro Aoki, Machida, and Taizi Nagatani, Sagamihara, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 607,687, Aug. 25, 1975, abandoned. This application Feb. 8, 1977, Ser. No. 766,740
Claims priority, application Japan, Aug. 26, 1974, 49-97731
Int. Cl.[2] C22C *38/02, 38/04;* **B23K** *35/22*
U.S. Cl. 219—146.1 **3 Claims**

1. A steel gas shielded transfer welding wire for use under short circuiting transfer conditions consisting essentially of 0.5 to 1.0% of Si, 1.0-2.0% Mn, not more than 0.015% of P, S and N, respectively, 0.07 to 0.20% of C and not more than 0.020% of total oxygen, said total oxygen content being the sum of the oxygen within the wire plus any oxygen adhered to the surface of the wire, the amount of said oxygen within the wire being more than 0.004%, with the balance being iron, and wherein the distribution index of the number of any non-metallic inclusions in the longitudinal cross section of the wire is not higher than 1.0 as calculated by the following formula:

$$\text{Distribution Index} = \frac{\text{Number of (inclusions [over]) between 5}\mu\text{ to 10}\mu + \text{Number of (inclusions [over]) between 10}\mu\text{ to 20}\mu \times 5 + \text{Number of (inclusions) over 20}\mu \times 10}{\text{Number of measured view fields}}$$

4,087,675

HEATED MITTEN

Coretta Sansonetti, 502 Willow Rd., Elmhurst, Ill. 60126

Filed Feb. 7, 1977, Ser. No. 766,047
Int. Cl.[2] H05B *1/00*
U.S. Cl. 219—211 **6 Claims**

1. A heated mitten for use in conjunction with the application of hand cream or the like comprising:

an inner mitten for placement on a human hand, said inner mitten forming an open ended hand receiving chamber therein;

an outer mitten forming an open ended heated chamber therein, said heated chamber being dimensioned to capture and removeably retain therein said inner mitten having said human hand inserted therein;

means for electrically heating said heated chamber of said outer mitten;

means for regulating the temperature at which said electrical heating means operates; and

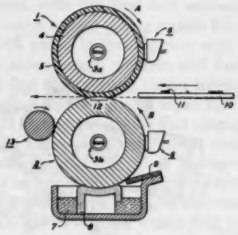
means for storing said hand cream within said inner mitten including at least one reservoir provided in said inner mitten for retaining said hand cream therein, said reservoir being covered by a meltable membrane, said membrane retaining said hand cream within said reservoir until a source of artificial heat is applied thereto.

4,087,676

FIXING APPARATUS WITH HEAT AND PRESSURE FOR ELECTROPHOTOGRAPHIC COPIERS

Yasuji Fukase, Ebina, Japan, assignor to Rank Xerox Ltd., London, England

Filed Feb. 8, 1977, Ser. No. 766,817
Claims priority, application Japan, Dec. 26, 1975, 50-154720
Int. Cl.[2] H05B 1/00; G03G 15/20
U.S. Cl. 219—216 1 Claim



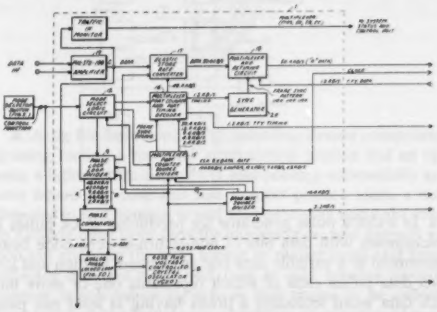
1. Apparatus for fixing toner images to copy substrates, said apparatus comprising:
- a first roll including an elastomeric outer layer;
- a second roll contacting said first roll and cooperating therewith to form a nip through which said copy substrates pass with said toner images contacting said elastomeric outer layer;
- means supported internally of said first roll for elevating the surface temperature thereof;
- means disposed internally of said second roll for elevating the surface temperature thereof directly and indirectly serving to assist said means disposed internally of said first roll to thereby elevate the surface temperature of said first roll;
- said elastomeric layer comprising silicone rubber and said second roll being fabricated from metal; and
- means for applying a functional release agent fluid to the surface of said second roll and subsequently to said first roll through contact of said second roll with said first roll.

4,087,677

DIGITAL PSK MODEM

James Grant Dunn, Upper Montclair, and Philip Duncan Carmichael, Closter, both of N.J., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Filed Sep. 29, 1976, Ser. No. 728,094
Int. Cl.[2] H02B 1/00
U.S. Cl. 325—30 44 Claims



14. A digital PSK (phase shift keyed) modem comprising:
a transmitter portion including
- first means to multiplex first digital data and first teletype signals to provide first digital data signals;
- second means coupled to said first means to convert said first digital data signals into second digital data signals having a different digital form than said first digital data signals; and
- third means coupled to said second means responsive to said second digital data signals to provide a first PSK signal for transmission; and

a receiver portion including
- fourth means to receive a second PSK signal containing third digital data signals having multiplexed second digital data and second teletype signals;
- fifth means coupled to said fourth means to extract said third digital data signals from said second PSK signal;
- sixth means coupled to said fifth means to convert said third digital data signals into fourth digital data signals having a different digital form than said third digital data signals; and
- seventh means coupled to said sixth means responsive to said fourth digital data signals to separate said second digital data and said second teletype signals for utilization;

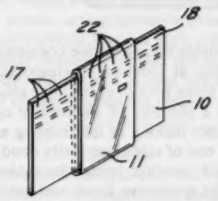
said fifth means including
- a PSK demodulator coupled to said fourth means,
- a number controlled oscillator coupled to said PSK demodulator,
- a digital phase shifter coupled to said number controlled oscillator,
- an accumulator coupled to said digital phase shifter,
- a clock recovery circuit coupled to said accmulator, said sixth means and said number controlled oscillator, and
- a loop filter coupled to said accumulator, said seventh means, said clock recovery circuit and said number controlled oscillator.

4,087,678

LIBRARY LATE-BOOK FINE COMPUTER

George Bonsall, Williamsport, Pa., assignor to Brodart, Inc., Williamsport, Pa.

Filed May 24, 1976, Ser. No. 689,005
Int. Cl.[2] G09D 1/00
U.S. Cl. 235—86 1 Claim



1. A library late-book fine computer comprising:
(a) a relatively stiff rectangular card having two parallel guide edges,
(b) a series of dates uniformly spaced on at least one face of said card a predetermined distance from each other, each of said dates including a month and day, said dates being arranged in day-by-day sequence increasing in a first direction in each of a plurality of parallel columns which extend perpendicular to said guide edges, each column of dates including the same number of dates,
(c) a continuous flexible band extending around the guide edges of said card, said base being viewable through said band,
(d) a series of numbers, indicating amounts of fines, uniformly spaced on said band the same predetermined distance as said dates, the numbers being in sequence and increasing in a direction opposite to said first direction in each of a plurality of columns, said columns of numbers being parallel to each other and to said columns of dates,

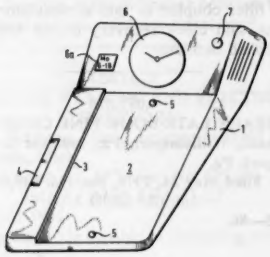
each successive number in each column of numbers being larger than its immediately previous number by the amount of one day's fine, one of said columns of numbers beginning with a zero position, said one column having a number of numbers, including the zero position, at least equal to the dates in each date column, and the remainder of the columns of numbers having a number of numbers at least equal to twice the number of dates in each date column minus one, each number in each number column being aligned in a direction parallel to said guide edges with numbers in the other number columns, the difference between each number and an aligned number in an adjacent column being equal to the number of dates in each date column multiplied by one day's fine, and

(e) said band being slidable along the guide edges of said card, and said band being movable around said card in the direction of continuity of said band.

4,087,679
PROGRAMMABLE TIMING DEVICE FOR INDICATING APPOINTMENTS

Nikolay Samreus nee Maymarev, Sundbyberg 6, Stockholm, Sweden

Continuation-in-part of Ser. No. 380,468, Jul. 18, 1973, Pat. No. 3,934,120. This application Jan. 19, 1976, Ser. No. 650,069
Claims priority, application Germany, Feb. 22, 1975, 2507692
Int. Cl.[2] G06K *7/06, 19/02;* **G04C** *21/16*
U.S. Cl. 235—441 **63 Claims**



1. A programmable timing device comprising a support for receiving markings at locations corresponding to predetermined times in a given period, at least one electrically conductive bus bar and a plurality of electrically conductive paths, said markings either making or interrupting an electrical connection between one of said electrically conductive paths and said bus bar, said location being designated by characters which indicate the respective hours and predetermined intervals in minutes of the given period, timing means for deriving sequential timing signals at predetermined intervals during said period and means for deriving a predetermined time output signal whenever of said timing signals occurs at the predetermined time represented by the respective one of said marking.

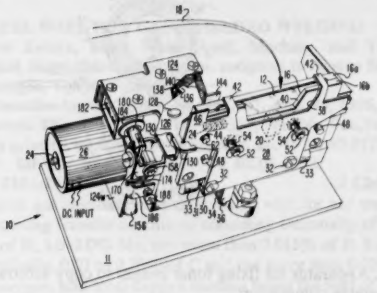
4,087,680
SEMIAUTOMATIC CREDIT CARD INFORMATION HANDLING APPARATUS

Ronald H. Mack, Plymouth, and Donald L. Bumgardner, South Lyon, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Apr. 22, 1977, Ser. No. 789,946
Int. Cl.[2] G06K *7/08;* **G06F** *7/02;* **G11B** *25/04*
U.S. Cl. 235—449 **10 Claims**

1. Free standing apparatus for automatically reading information from or writing information upon an information bearing credit card comprising:

1. a base member;
2. carriage means including signal generating read/write means slidably mounted relative to said base member for movement along a linear path with respect to said base member;
4. means in the path of movement of said read/write means operable to indicate the origination and termination of movement of said read/write means;
5. means operably associated with said base member and said credit card supporting means for accurately locating said card relative to said read/write means effective to initiate read/write operation;

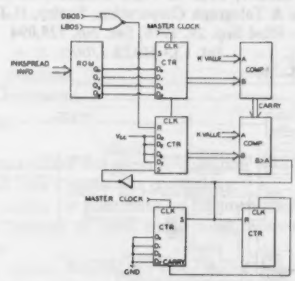


6. means conjointly movable with said card locating means for flattening said card and locking the card against dislodgement or accidental removal;
7. means for timing the read/write operation to enable the automatic disposition of information relative to said credit card; and
8. drive means operably interconnected with said timing means for moving said read/write means relative to said credit card effective to produce a signal in said read/write means characteristic of information carried by said card.

4,087,681
ASYNCHRONOUS TO SYNCHRONOUS CONVERTER

John Patrick Spencer, Bellingham, Wash., and Anthony Joseph Torre, Warren, Mich., assignors to Schiller Industries, Inc., Troy, Mich.

Filed Jun. 11, 1976, Ser. No. 695,290
Int. Cl.[2] G06K *7/14;* **H03K** *9/03*
U.S. Cl. 235—466 **8 Claims**



1. In a clock pulse generator for producing clock pulses in synchronism with data bits of non-return-to-zero code being transmitted at a variable data rate as a stream of high and low level data pulses each of which represents one or more bits, each data word including a prefix having at least one pulse representing a predetermined number of bits, said generator comprising a master clock, a bit clock system including a first and a second bit clock generator, said first bit clock generator being connected with a source of data pulses and with the master clock for producing a first timing signal when the data pulse has a duration which corresponds to one bit time of a

data pulse, said second bit clock generator being connected with the master clock and with the output of the first bit clock generator for producing succeeding timing signals when said data pulse has a duration which exceeds the bit time of a data pulse, and measurement means connected with said source of data pulses for measuring the time duration of the prefix pulses to produce a measurement signal having a value corresponding to the bit time at the existing data rate, and clock signal generating means connected with the first and second bit clock generators and responsive to said timing signals for producing a serial stream of clock pulses in synchronism with the bits of said data pulses, the improvement wherein said first bit clock generator comprises first multiplexing means having first and second inputs, an output and a selector input for selectively connecting the first or second input with said output, said first input being connected with said measurement means for receiving a signal corresponding to one-half bit time of a high level data pulse, said second input being connected with said measurement means for receiving a signal corresponding to one-half bit time of a low level data pulse, first comparator means having first and second inputs adapted to receive signals for value comparison and having an output adapted to produce said first timing signal when the signal applied to said second input exceeds the signal applied to said first input of the first comparator means, the output of said first multiplexing means being connected with said first input of said first comparator means, said selector input of the first multiplexing means being connected with said source of data pulses, and first counting means having an input connected with said master clock and having an output connected with said second input of said first comparator means, and means for starting said first counting means at the initiation of a data pulse whereby said first timing signal is produced one-half bit time after initiation of a high level data pulse or one-half bit time after initiation of a low level data pulse.

4,087,682

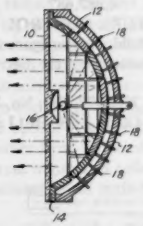
ILLUMINATING DEVICE

Henry W. Kolodziej, P.O. Box 296, Ocean Grove, N.J. 07756

Filed Mar. 15, 1976, Ser. No. 667,139

Int. Cl.² F21V *13/04*

U.S. Cl. 362—297 **5 Claims**



3. A jig for fashioning an illuminating device comprising a housing having a base and a supporting portion and an open area, a light source disposed in said housing substantially at an area where said base and said support portion meet, a baffle disposed in said housing at said area overlying said light source to exclude light from directly impinging on said support portion but allowing the light source to radiate upon said base, a reflector disposed upon said base in said housing having a contour which causes light from said source to be reflected from said base in parallel rays, a plurality of reflecting elements disposed in said housing on said supporting portion oriented to receive the parallel rays emanating from said reflector, each of said reflecting elements having means for adjusting the angle of orientation of said reflecting elements so that light impinging on said reflective elements may be focused as it travels outwardly from said housing through said open area.

4,087,683

IMAGE INTENSIFYING DEVICE

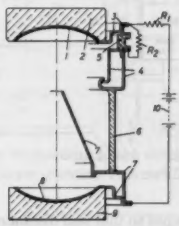
Albert Lieb, Bellenberg, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Aug. 17, 1976, Ser. No. 715,173

Claims priority, application Germany, Aug. 29, 1975, 2538447; Mar. 13, 1976, 2610601; Apr. 15, 1976, 2616624

Int. Cl.² H01J *31/50*

U.S. Cl. 250—213 VT **23 Claims**



1. An image intensifying device having a photocathode layer applied to an inner surface of a light-transmissive photocathode carrier and having a cathode electrode, which has a first annular electrode part connected electrically to said photocathode layer and has a second annular electrode part and which is connected to the negative pole of a d.c. voltage source, the device further including an anode electrode provided with a fluorescent screen, characterized in that said second electrode part is connected to said first electrode part by an annular insulating part inserted therebetween, that said first electrode part has a smaller area than said second electrode part, that said first electrode part is connected to said second electrode part via a high value electrical intermediate resistance, and that said first annular electrode part is connected electrically to said negative pole of said voltage source via a high value cathode resistance, the resistance value of said cathode resistance being selected so that when there is an optical radiation, which would exceed the loading capacity of said fluorescent screen, acting intensely over a long period of time on said photocathode layer, a high voltage drop occurs across said cathode resistance so that the energy of the electrons meeting said fluorescent screen does not exceed the loading capacity of said fluorescent screen.

4,087,684

FIBER OPTICS PROPORTIONAL CONTROL SYSTEM

Richard C. Mott, Harwood Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 649,172, Jan. 14, 1976, abandoned. This application Jan. 31, 1977, Ser. No. 764,260

Int. Cl.² G01D *5/34;* G02B *5/14;* H01J *5/16*

U.S. Cl. 250—231 R **13 Claims**

2. A proportional closed loop control system for moving a movable output a distance proportional to a sensed condition comprising:

actuating means having a movable output adapted to change the position of a condition controlling device;

an element movable in response to a condition;

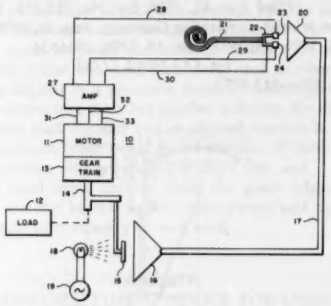
light source means attached to one of said movable output and said element;

light responsive means attached to the other of said movable output and said element, said light responsive means responsive to light from said light source means to provide an output;

connecting means connecting said light responsive means to said actuating means for operating said actuating means in accordance with said output from said light responsive means; and,

optical feedback means for transmitting light from said light

source means to said light responsive means, said optical feedback means controlling the distance of movement of



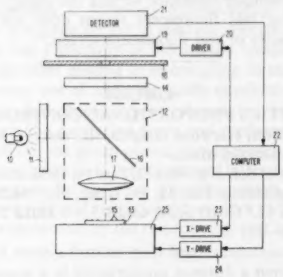
said movable output so that said distance is proportional to said output from said light responsive means.

4,087,685

FLUORESCENT MICROANALYTICAL SYSTEM AND METHOD FOR DETECTING AND IDENTIFYING ORGANIC MATERIALS

Howard Arthur Froot, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 11, 1977, Ser. No. 758,516
Int. Cl.² G09K *3/00*
U.S. Cl. 250—302 **10 Claims**



1. A system for detecting possible contaminating organic luminescent materials carried on or embedded in a device under manufacture, said materials having been used in the manufacture and having known luminescent emission spectra, said system comprising;

means for exposing the device to electromagnetic radiation of sufficient energy to cause the organic materials with the known emission spectra to luminesce;

means for detecting luminescent emission spectra emanating from the device as a result of the exposure; and

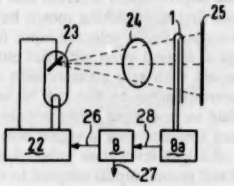
means for comparing said emission spectra with the known emission spectra of the organic materials used in manufacture thereby detecting whether any one of these materials are contaminating said device.

4,087,686

X-RAY DIAGNOSTIC APPARATUS FOR X-RAY FILM PHOTOGRAPHS WITH AN AUTOMATIC EXPOSURE TIMER

Herbert Schmitmann, Weiher, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sep. 29, 1976, Ser. No. 727,401
Claims priority, application Germany, Nov. 10, 1975, 2550437
Int. Cl.² G03B *41/16*
U.S. Cl. 250—322 **4 Claims**



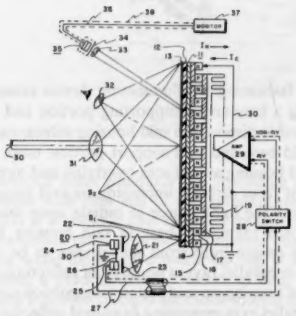
1. In an x-ray diagnostic apparatus including an automatic exposure timer for controlling the exposure of x-ray film photographs and having a radiation detector, a signal processing circuit connected with said detector, and a switch-off device responsive to a switch-off signal from the signal processing circuit for turning off an x-ray source when the x-ray film has received a predetermined radiation dose, characterized in that the signal processing circuit contains switching means connected to the switch-off device and automatically operable, in the absence of an inhibiting signal during a given time interval after initiation of an exposure, for supplying a switch-off signal to said switch-off device, and inhibiting signal means coupled with said radiation detector and responsive to a signal above a predetermined limit which occurs within said given time interval for supplying an inhibiting signal to said switching means, said switch-off device being operated by said switching means to turn off said x-ray source at the end of said given time interval whenever the signal produced by the radiation detector is below the predetermined limit or if no signal is produced.

4,087,687

TEMPERATURE CONTROL DEVICE

Gerald T. Bean, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 28, 1977, Ser. No. 763,760
Int. Cl.² G02F *1/13*; H01J *31/50*
U.S. Cl. 250—331 **9 Claims**



1. A thermal viewing system comprising:

a layer of liquid crystal having first and second mutually exclusive portions which reflect a characteristic color of

light for each of a plurality of temperature increments within a given temperature range;

a heat sink;

a heat transfer plate attached to said layer;

a reversible heat transfer means connected between said sink and said plate to change the temperature of said plate in response to an input electrical signal;

infrared focussing means coupled with said layer to project an infrared image only on said first portion thereof;

a source of visible light coupled with and illuminating said first portion and said second portion whereby said infrared image is rendered visible when said transfer plate is maintained at fixed temperature within said given temperature range; and

a first optical detector means electrically coupled to said heat transfer means to detect color changes only in said second portion of said crystal layer and to generate said electrical input signal in inverse proportion thereto whereby equal and opposite temperature changes are induced in said transfer plate.

4,087,688

INFRARED RADIATION-BURGLARY DETECTOR

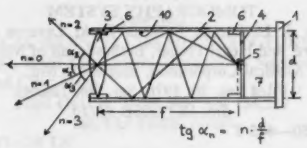
Hansjürg Keller, Mannedorf, Switzerland, assignor to Cerberus AG, Mannedorf, Switzerland

Filed Nov. 4, 1976, Ser. No. 738,908

Claims priority, application Switzerland, Jun. 16, 1976, 7592/76

Int. Cl.² G08B *13/18*; G01J *1/02*

U.S. Cl. 250—342 **15 Claims**



1. An infrared radiation-burglary detector comprising a single radiation receiver, an optical system for focusing radiation upon the single radiation receiver from a number of separate receiving regions, said optical system having an optical axis, internally reflecting prism surface means arranged between the optical system and the radiation receiver, said internally reflecting prism surface means enclosing said optical axis of the optical system and being arranged substantially axially parallel thereto, said optical system focusing radiation on said single radiation receiver from different ones of said receiving regions after a different number of reflections for each receiving region at said internal prism surface means.

4,087,689

BORESIGHTING SYSTEM FOR INFRARED OPTICAL RECEIVER AND TRANSMITTER

Charles K. Asawa, Pacific Palisades, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 22, 1976, Ser. No. 744,071

Int. Cl.² H01J *31/49*

U.S. Cl. 250—342 **12 Claims**

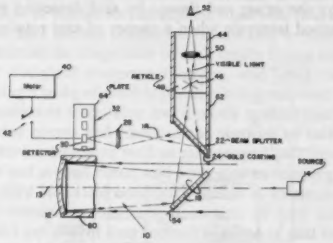
1. A boresighting system comprising:

an optical telescope for passing IR and visible energy along an optical path including a target;

a beamsplitter in said optical path for reflecting a substantial portion of the IR energy and transmitting at least a portion of said visible energy;

a sighting telescope positioned to receive the transmitted visible energy from said beamsplitter and including a sighting reticle;

IR detector means in said optical path for responding to the level of IR energy and developing current; and



meter means for responding to the detector current to determine a maximum current representative of a boresight condition.

4,087,690

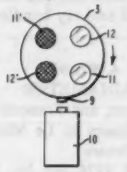
SPURIOUS RADIATION COMPENSATION IN INFRARED ANALYZERS

James Merrill Prober, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 22, 1976, Ser. No. 698,698

Int. Cl.² G01J *1/00*; G01N *21/24, 21/26*

U.S. Cl. 250—343 **10 Claims**



1. The method of compensating infrared radiation photometric analyzers for extraneous infrared radiation contributed by apparatus elements, as distinguished from the analytical and reference radiation signals per se, comprising providing a movable filter support structure interposing individual filters sequentially across the infrared radiation beam with radiation non-transmitting dummy ports of the same size, type and composition as their transmitting counterparts blocked with an opaque material on the analyzer source side, and electrically cancelling the effects of said extraneous infrared radiation from the individual measured signals of the analytical and reference filters with outputs contributed by their dummy counterparts during each operating cycle of said movable filter support structure.

4,087,691

REFERENCE RADIATION SOURCE IN A DEVICE FOR MEASURING THE RADIATION FROM AN OBJECT

Jens Karl-Olof Agerskans, Akersberga, and Andras Agoston, Täby, both of Sweden, assignors to AGA Aktiebolag, Lidingo, Sweden

Continuation of Ser. No. 673,803, Apr. 5, 1976, abandoned. This application Jul. 5, 1977, Ser. No. 815,839

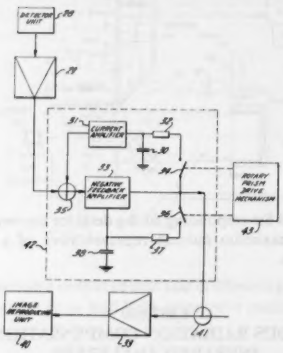
Claims priority, application Sweden, Apr. 9, 1975, 7504051

Int. Cl.² G01J *1/00*

U.S. Cl. 250—347 **6 Claims**

1. A device for measuring the radiation from an object by means of an optical system comprising detecting means for providing an output signal in response to radiation impinging thereon, scanning means for scanning a ray bundle in an image space, said scanning means including at least one refracting

rotating prism, the center of rotation of said prism and said detecting means defining an optical axis, at least two reference radiation sources spaced from one another and positioned in the optical system in order that said radiation sources are scanned by the prism and thence by said detecting means at predetermined intervals when a corner of said rotating prism



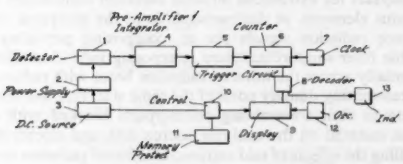
passes through said optical axis, means utilizing said detecting means output signal, and control means for controlling said utilizing means in a manner whereby an object image signal is utilized by said utilizing means at intervals not coincident with scanning of either of said radiation sources, said ray bundle converging toward said prism and said radiation sources each being of a size so as to fill said ray bundle.

4,087,692

RADIAMETER

Pierre Leon Denis Lecuyer, and François Crousillac, both of Boulogne, France, assignors to Le Material Telephonique, Boulogne-Billancourt, France

Filed Nov. 22, 1976, Ser. No. 744,044
Int. Cl.[2] G01T *1/22*
U.S. Cl. 250—370 **9 Claims**



1. Improved apparatus for measuring radioactive radiation, said apparatus being of a type that comprises: a detection circuit including at least one solid-stage detector; a pre-amplifier circuit for integrating the output of said detection circuit thereby to obtain a voltage which is proportional to the electrical charges which are released by the ionization which occurs within said at least one detector as a result of said radiation; a trigger circuit connected to said pre-amplifier circuit for generating a pulse each time that said voltage exceeds a given threshold level; means for counting said pulses; and means for displaying said count, wherein the improvement comprises:

a plurality of dissimilar detectors in said detection circuit, said detectors being electrically associated to provide an overall response which compensates for the individual response of each detector and which results in a sensitivity which is independent of the spectrum of the incident radiation; and

means for directly connecting the output of said pre-amplifier circuit to the input of said trigger circuit.

4,087,693

SENSORS FOR USE IN NUCLEAR REACTOR CORES

William L. Brown, Minneapolis, and Robert L. Geronime, Rosemount, both of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.

Filed Mar. 17, 1976, Ser. No. 667,684
Int. Cl.[2] G01T *3/00*
U.S. Cl. 250—390 **15 Claims**

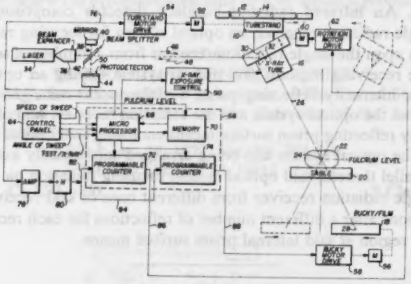
1. A sensor assembly for use in radiation environments comprising an elongated joint free outer sheath, at least one wire means for carrying signals within said outer sheath, insulation means in said sheath closely surrounding said wire means for holding said wire in insulated, spaced relationship to the outer sheath, one end of said wire means terminating in means forming a sensor to be used in the radiation environment, and means closing the end of said outer sheath adjacent said means forming a sensor comprising a backing member on the interior of said sheath, the end of said sheath having a wall portion engaging said backing member, and weld means welding the wall portion of said sheath and said means forming the backing member together to close the end of said sheath adjacent said means forming a sensor.

4,087,694

TOMOGRAPHY SYSTEM

Melbourne J. Hellstrom, Severna Park; Laverne R. Bunch, Baltimore, and Henri Froger, Bethesda, all of Md., assignors to CGR Medical Corporation, Baltimore, Md.

Filed Sep. 20, 1976, Ser. No. 724,641
Int. Cl.[2] G03B *41/16*
U.S. Cl. 250—445 T **21 Claims**



1. A method for non-mechanically linking the motions of an X-ray tube unit with an X-ray receptor unit during a tomographic procedure comprising the steps of:

effecting a predetermined motion of one of said units;

sensing via radiant energy a parameter which is a function of the position of said one unit and generating a parameter signal therefrom by directing a source of radiant energy to a reference location, receiving energy reflected therefrom and detecting the difference characteristic between the energy radiated to and the energy received from said reference location;

generating a command signal in response to said parameter signal; and

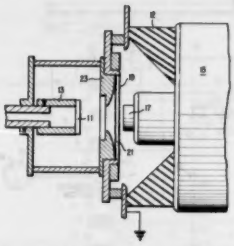
applying said command signal to said other unit for effecting a follower motion of said other unit with respect to said one unit.

4,087,695

METHOD FOR PRODUCING OPTICAL BAFFLING MATERIAL USING PULSED ELECTRON BEAMS

John N. Lee, Silver Spring, and Robert B. Oswald, Jr., Bethesda, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 17, 1977, Ser. No. 759,707
Int. Cl.[2] G02B 27/00; A61K 27/02
U.S. Cl. 250—492 B 9 Claims



1. A method of producing a durable optical baffling material comprising the steps of:

providing a starting material;

polishing the surface of the starting material to a mirror finish; and

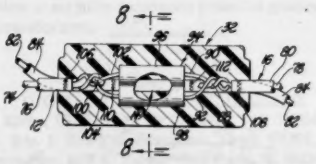
bombarding the surface of the starting material with a pulsed beam of electrons having a pulse length of about 0.1 microseconds to make the surface appear black in color.

4,087,696

ELECTRICAL BRANCH CIRCUIT STRUCTURE MEANS

Dale L. Bull, Reed City, Mich., assignor to Nartron Corporation, Reed City, Mich.

Filed Oct. 20, 1976, Ser. No. 734,237
Int. Cl.[2] H05K 15/00
U.S. Cl. 307—10 LS 16 Claims



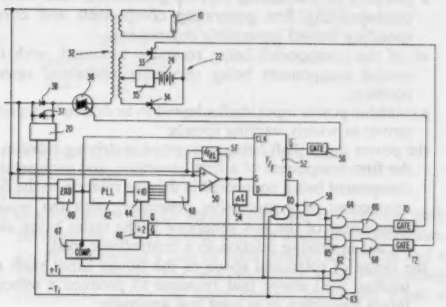
1. Electrical circuit means, comprising first electrical conductor means, second electrical conductor means, third electrical conductor means, said first electrical conductor means comprising an inner disposed electrically conductive first core, outer disposed electrically insulating first cover means carried by said first core, said second electrical conductor means comprising an inner disposed electrically conductive second core, outer disposed electrically insulating second cover means carried by said second core, said third electrical conductor means comprising an inner disposed electrically conductive third core, outer disposed electrically insulating third cover means carried by said third core, said third electrical conductor means extending in a direction generally as that assumed by said first and second electrical conductor means and in at least relatively close proximity thereto, said first core having first and second ends effective for electrical connection, said second core having third and fourth ends effective for electrical connection, said third core having fifth and sixth ends effective for electrical connection, relatively low-tensile-strength electrical component means electrically situated generally between said second and third ends of said first and second cores respectively and electrically connected thereto, and connector means directly connected to said first second and third cover means and generally bridging said electrical component means, said connector means being effective to transmit at least a substantial portion of tensile forces applied from said first conductor means to said second conductor means and to that extent at least minimize the magnitude of such tensile forces experienced by said electrical component means, said connector means comprising a body of electrically insulating material, said body being molded as to envelop and directly contact said electrical component means and longitudinal portions of said first and second cover means as well as said second and third ends of said first and second cores, said body also enveloping a portion of said third electrical conductor means as to encompass and directly contact a longitudinal section of said third cover means and yet permit longitudinal portions of said third cover means and said fifth and sixth ends of said third core to extend beyond said body, said body thusly encompassing and directly contacting said longitudinal section of said third cover means being effective to transmit at least a portion of said tensile forces to said third conductor means.

4,087,697

RAPID POWER TRANSFER SYSTEM

Robert W. Johnson, Levittown, Pa., assignor to ESB Incorporated, Philadelphia, Pa.

Filed Oct. 1, 1976, Ser. No. 728,863
Int. Cl.[2] H02J 7/00, 9/00
U.S. Cl. 307—66 20 Claims



1. A rapid transfer circuit for disconnecting a load from an AC source including an electronic valve having a predetermined holding current, and supplying power to the load by means of an inverter, comprising:

line sensing means adapted to be coupled to the AC source for deriving an indication of source voltage;

timing means coupled to said line sensing means for producing an indication of the phase of source voltage;

comparison means coupled to said line sensing means for receiving said source voltage indication and responsive thereto to produce a transfer signal in response to a drop in source voltage below a predetermined value;

an inverter adapted to be coupled to the load for supplying current thereto;

gating control means coupled to said comparison means and and said timing means and responsive to said transfer signal for selectively enabling the inverter to operate in phase with previously-detected line voltage,

detector means adapted to be coupled in current-detecting relationship with the electronic valve for producing an indication of the direction of current flow through the valve; and

commutating means responsive to said indication for inhibiting said gate control means and for enabling said inverter in a phase relationship such as to produce an output of the

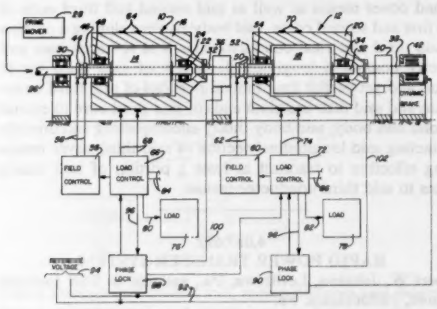
proper polarity to give rise to a current in the AC source which opposes current through the valve.

4,087,698

ALTERNATING CURRENT POWER GENERATING SYSTEM

John E. Myers, Littleton, Colo., assignor to Franklin W. Baumgartner, Denver, Colo.

Filed Apr. 22, 1977, Ser. No. 789,853
Int. Cl.[2] H02K *19/34, 19/36*
U.S. Cl. 307—84 **23 Claims**



1. An alternating current power generating system comprising:

a plurality of alternating current generators, each having corresponding first generating components and corresponding second generating components;

all of the components being rotatably mounted, with the second components being releasably restrained against rotation;

a rotatable power input shaft adapted to be driven by a prime mover at widely varying speeds;

the power input shaft being connected in driving relation to the first component of a first generator, and each second component being connected in driving relation to the first component of a successive generator, with the second component of the last generator in the series being connected in driving relation to a controllable load;

the range of rotational speed of the power input shaft extending well above that required to produce a selected target frequency in at least one generator;

and sensing and control means operative to selectively and sequentially sense the attainment of the target frequency of the current produced by the first and successive generators and to act in response to the attainment of such frequencies to initially release the second component of the first generator and allow it to rotate and maintain a relative rotational speed between itself and the first component corresponding to the target frequency and to drive the first component of the second generator, and to sequentially release the second components of successive generators as they attain the target frequency.

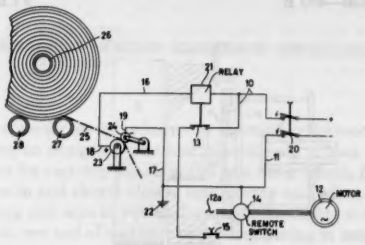
4,087,699

APPARATUS FOR MONITORING THE CONTINUITY OF A WEB IN A PROCESSING MACHINE

Angelo Marzoli, Bergamo, Italy, assignor to F.LLI Marzoli & C. S.p.A., Brescia, Italy

Filed Jul. 19, 1976, Ser. No. 706,842
Claims priority, application Italy, Jul. 22, 1975, 25639 A/75
Int. Cl.[2] H01H *83/00*
U.S. Cl. 307—116 **4 Claims**

1. An apparatus for checking the continuity of a web, more particulary of a gauze, in a machine preparatory to spinning, such as a combing machine with a frame, comprising: a hub from which said web is unrolled, a branched off circuit having two terminals yielding pressed into electrical contact and providing a passageway for the web downstream of said hub from which the web is unrolled, a remote control switch driven by said branched off circuit responsive to the contact of said two terminals, a switch in the feeding circuit of the machine and opened by said remote control switch preparatory to spinning when said two terminals come into mutual contact due to absence of a web therebetween, a first cylinder connected to one of said terminals and fixedly supported on the



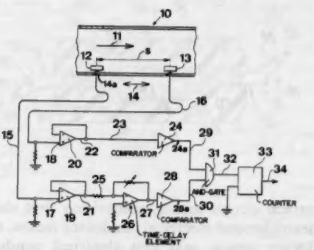
machine, a second cylinder connected to the other terminal and movably supported so as to vary a gap between said cylinders, said second cylinder being electrically connected to ground potential, said cylinder fixedly supported on the machine being electrically connected to positive voltage potential, and insulating bushing means between the machine and the cylinder connected to positive potential for insulating the machine frame electrically.

4,087,700

MONITORING APPARATUS FOR A TEXTILE MACHINE

Karl Curiger, Pfaffikon; Hermann Gasser, Zurich, and Stephan Wüest, Weinfelden, all of Switzerland, assignors to Luwa AG, Zurich, Switzerland

Filed Sep. 20, 1976, Ser. No. 724,772
Claims priority, application Switzerland, Sep. 29, 1975, 12577/75
Int. Cl.[2] H01H *35/00*
U.S. Cl. 307—116 **19 Claims**

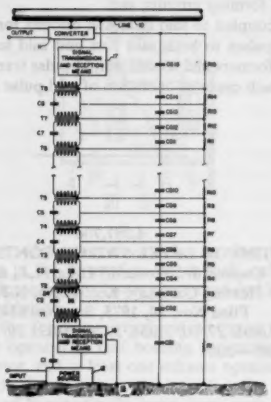


1. A monitoring apparatus for monitoring irregular operation of a textile machine, comprising means for conveying textile material in a predetermined direction of movement, feeler means cooperating with said conveying means for sensing the presence of the textile material moving therepast, said feeler means comprising two single electrodes arranged in offset relationship from one another in the direction of movement of the textile material, each single electrode delivering an electrode signal when the textile material moves therepast, an evaluation circuit operatively connected with said feeler means, said evaluation circuit comprising logic circuitry responsive to said electrode signals having a time displacement at least approximately corresponding to the transit time of the textile material from one electrode to the other electrode.

4,087,701
TRANSFORMER CASCADE FOR POWERING ELECTRONICS ON HIGH VOLTAGE TRANSMISSION LINES

John M. Anderson, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 10, 1977, Ser. No. 767,573
Int. Cl.[2] H02J *13/00*
U.S. Cl. 307—149 16 Claims



1. Apparatus for transmitting electric power and information signals from a source at a first potential to a load at a second potential comprising:

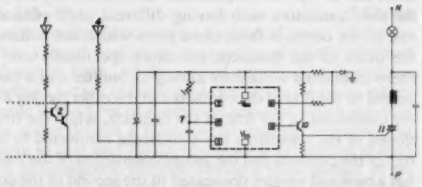
two or more transformers, each including a primary winding, a secondary winding, with a magnetic core linking said windings, connected in cascade, the primary windng of a first transformer in said cascade being connected to said source and the secondary winding of a last transformer of said cascade being connected to said load; and

grading network means connected to said first potential, to second potential, and to each of said transformers which function to maintain a constant potential gradient between said transformers.

4,087,702
DIGITAL ELECTRONIC DIMMER

James P. Kirby, 502 S. Park Dr., Austin, Tex. 78704; Peggy D. Dudley, Rte. 1, Box 290, Scappoose, Oreg. 97056, and David A. Schwendner, 819 S. Euclid, Oak Park, Ill. 60304

Filed Mar. 9, 1976, Ser. No. 665,293
Int. Cl.[2] H03K *17/56*
U.S. Cl. 307—252 B 21 Claims



1. An electronic circuit for digital phase-shifted triggering of a triac to vary the amount of power to a load from a line voltage source, comprising:

(a) signal input means for receiving a plurality of input signals;

(b) discriminator means for generating on/off and power change signals in response to input signals received;

(c) oscillator means for providing a subdividing signal having a frequency higher than the line voltage;

(d) phase shift counter means for generating a plurality of phase shift signals within each half-period of the line voltage in response to the subdividing signal, each of the phase shift signals representing a different potential phase-shifted firing time for the triac within each half periof of the line voltage;

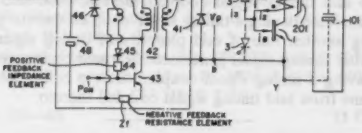
(e) power level counter means for selecting and storing one of a plurality of power level signals in response to a power change signal generated by said discriminator means; and

(f) matrix means for evaluating the stored power level signal and the plurality of phase shift signals to determine a firing time for the triac which corresponds to the stored power level signal and for generating a trigger signal for firing the triac at the firing time selected.

4,087,703
SEMICONDUCTOR SWITCH DEVICE

Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 12, 1976, Ser. No. 704,491
Claims priority, application Japan, Aug. 28, 1975, 50/104311
Int. Cl.[2] H03K *17/04, 17/12, 17/60*
U.S. Cl. 307—253 13 Claims



1. A semiconductor switch device comprising:

a power source;

a load;

a semiconductor switch serially disposed in a current path between the power source and the load, the semiconductor switch having a pair of main current electrodes and a control electrode, the semiconductor switch becoming conductive across the main current electrodes when a forward current is applied to the control electrode;

a current transformer having a core, a primary conductor serially disposed in the current path and a secondary winding connected to the control electrode whereby a current responding to the current passed through the current path is supplied to the control electrode;

an auxiliary power pulse supply means connected in series with the secondary winding of the current transformer, the auxiliary power pulse supply means applying a forward polarity pulse to the control electrode;

detection means operable in response to the flux of the core of the current transformer, the auxiliary power pulse supply means being controlled by the output of the detection means.

4,087,704
SEQUENTIAL TIMING CIRCUITRY FOR A SEMICONDUCTOR MEMORY

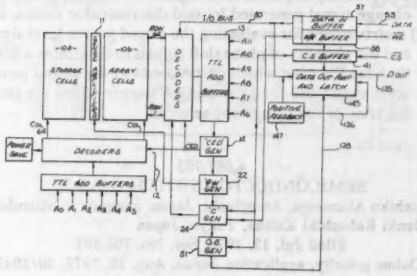
Rustam J. Mehta, Sunnyvale, and Michael Geilhufe, Los Gatos, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Division of Ser. No. 520,797, Nov. 4, 1974, Pat. No. 3,959,781.
This application Jan. 14, 1976, Ser. No. 649,148
Int. Cl.[2] H03K *5/15;* G11C *7/00, 8/00, 11/40*
U.S. Cl. 307—262 7 Claims

1. In a semiconductor memory, having a plurality of circuit elements coupled together to selectively manipulate binary

information stored within a plurality of storage cells, said circuit elements having an ordered logical sequence to manipulate said stored binary information, a timing circuit comprising:

a plurality of timing generators for generating a corresponding plurality of timing signals in an order corresponding to said ordered logical sequence, said corresponding plurality of timing signals being coupled to said plurality of circuit elements, each said circuit element being responsive to at least one of said timing signals; and



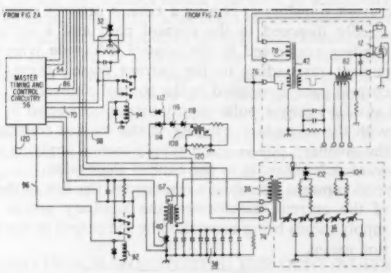
interconnection and triggering means for coupling predetermined ones of said timing signals from each of said timing generators to at least one other one of said plurality of timing generators, each said timing generator having a timing signal coupled thereto being activated in response to said timing signal coupled thereto, each said timing generator having a timing signal coupled thereto generating another one of said plurality of timing signals, said other timing signal generated each said timing generator having a timing signal coupled thereto being delayed in time from said timing signal coupled thereto.

4,087,705

HIGH POWER VARIABLE PULSE WIDTH TRIGGERING CIRCUITS

John A. Barnes, Stanton, Calif., assignor to Ritter Corporation, Garden Grove, Calif.

Filed Feb. 10, 1977, Ser. No. 767,347
Int. Cl.[2] H03K *1/18, 5/04*
U.S. Cl. 307—265 **10 Claims**



1. A high power low duty cycle pulse-forming system comprising:

a DC power source;

a charging inductor connected to said power source;

first pulse-forming circuit means for producing pulses of a predetermined duration, including a first bank of capacitors, a first pulse-forming network, and a first switching transformer connected between said bank of charging capacitors and said pulse-forming network;

second pulse-forming circuit means for producing pulses of a significantly different duration, including a second bank of capacitors, a second pulse-forming network and a second switching transformer connected between said second bank of capacitors and said second pulse-forming network;

first and second SCR means for selectively connecting said inductor to said first or said second bank of capacitors to charge one of said banks of capacitors;

third and fourth SCR means for selectively discharging either said first or said second bank of capacitors;

common output pulse transformer means connected to receive pulses from the selected one of said first or second pulse forming circuits; and

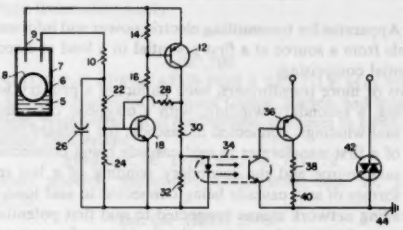
means coupled to said charging circuits for applying resetting pulses to both said first and said second switching transformers and to said output pulse transformer following each cycle of operation of said pulse forming system.

4,087,706

ELECTRONIC LEVEL SWITCH CONTROL SETUP

George L. Koester, Jr., Woodcliff Lake, N.J., assignor to Hynes Electric Heating Company, Kenilworth, N.J.

Filed Nov. 24, 1975, Ser. No. 634,940
Int. Cl.[2] G08B *27/00;* **H03K** *3/26;* **H01H** *29/28;* **G08B** *21/00*
U.S. Cl. 307—308 **2 Claims**



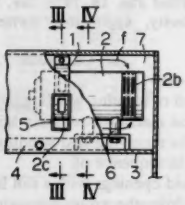
1. A remote control device responding to conditions in a particular locale, comprising an electrically conductive sensor whose level is determined by conditions in the locale, electrical contacts, the sensor having a position in which it will be out of contact with these electrical contacts and another position in which it will be in contact with the electrical contacts, and an electric circuit, said electrical contacts being located to provide a gap in the electrical circuit which said sensor will close in the position in which it is in contact with the contacts, and that circuit including a solid state relay adapted to energize an item being controlled, the solid state relay circuit having a portion including two transistors, another portion including a triac, and an optical coupler between these two portions, and the two transistors each having different parts connected to one of the contacts from those parts which are connected to the other of the contacts, and more specifically one of the there-mentioned transistors having an emitter and a base connected to the first of the contacts and the other having a collector connected to the first of the contacts, while the first-mentioned of the transistors has a collector connected to the second of the contacts and the second-mentioned of the transistors has a base and emitter connected to the second of the contacts, and there being a cross connection between the base of the first-mentioned transistor and the collector of the second-mentioned transistor, and a cross connection between the base of the second-mentioned transistor and the collector of the first-mentioned transistor, and likewise a cross connection between the base and emitter of the first-mentioned transistor and also a cross connection between the base and emitter of the second-mentioned transistor.

4,087,707

HEATED AIR DISSIPATING DEVICE FOR MOTOR USE IN A BATTERY-POWERED FORKLIFT TRUCK

Akibumi Shinoda, Handa, and Masahiko Shimizu, Obu, both of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Japan

Filed Sep. 24, 1976, Ser. No. 727,166
Claims priority, application Japan, Sep. 27, 1975, 50-116876
Int. Cl.[2] H02K 9/06
U.S. Cl. 310—63 6 Claims



1. A heated air dissipating device for an electric motor having a housing in the form of an outer shell and used to power a hydraulic pump in a battery-powered forklift truck, the device comprising:

an air exhaust fan forming part of said motor, at least one suction inlet opening in said housing for sucking air to cool said motor, and at least one exhaust opening in said housing for discharging air, said inlet and outlet openings being disposed longitudinally apart from each other in said outer shell and said fan being within said outer shell;

an enclosure defined by walls composed of a frame portion of the body of said forklift truck, and a cover portion therefor, for accommodating said electric motor therein, said motor being positioned substantially in parallel with one of said walls in its longitudinal direction and to one side in said enclosure;

an air exhaust duct which covers over and is spaced from said at least one outlet opening, said exhaust duct having an air exhausting opening in a portion thereof;

a heated air exhausting opening disposed in one of said walls defining said enclosure at a position confronting said air exhausting opening of said air exhaust duct for outletting hot air therefrom; and

at least one air inlet opening provided in a portion of at least one of said walls for inletting cool and fresh air from the atmosphere ambient into said enclosure.

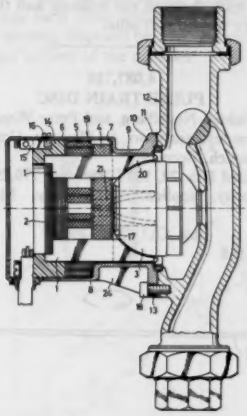
4,087,708

CASING FOR MOTORS HAVING A SPHERICAL AIR GAP

Nikolaus Laing, Hofener Weg 35-37, 7141 Aldingen, Germany

Filed Sep. 8, 1976, Ser. No. 721,560
Claims priority, application Germany, Sep. 17, 1975, 2541500
Int. Cl.[2] H02K 5/18
U.S. Cl. 310—64 5 Claims

1. A motor casing for enclosing a spherical motor where the motor has a stator comprising an annulus of axially disposed circumferential teeth, axially spaced principal and auxiliary coil windings, a stack of laminations forming a magnetic return and a rotor in the form of a spherical segment which together with the stator defines a spherical air gap; the improvement comprising in that said casing comprises a cylindrical shaped part of a non-magnetic material having a neck portion of reduced diameter at one end, in that said neck portion has a flange adapted to be attached to a pump casing, in that a plurality of circumferentially spaced segments are located within and integral with said cylindrical shaped part to extend between the circumferentially spaced teeth and which define a spherical surface facing the air gap, in that said reduced neck portion forms a radially extending first plane for engaging with and axially positioning the principal coil windings and in that said cylindrical part has a radially extending second plane portion for engaging with and axially positioning the auxiliary coil



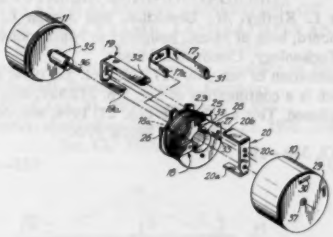
windings whereby heat from said coil windings may be conducted through said cylindrical part to said neck and flange portions.

4,087,709

ELECTRIC ROTATING MACHINE

Arthur W. Haydon, Breakneck Hill, Conn., assignor to Tri-Tech, Inc., Waterbury, Conn.

Continuation-in-part of Ser. No. 495,929, Aug. 8, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,739
Int. Cl.[2] H02K 7/10
U.S. Cl. 310—83 11 Claims



1. An electric rotating machine comprising, in combination:

means including an energizing winding for producing magnetic flux;

a bobbin for supporting said energizing winding;

a rotor having permanently magnetized north and south rotor poles;

gear train means connected to said rotor, said gear train means including a plurality of gears separately supported directly on said bobbin;

a stator structure disposed about the rotor and including at least one salient stator pole of soft magnetic material and at least one salient stator pole of hardened magnetic material in magnetic flux relationship with the rotor, the hardened stator pole being angularly spaced by approximately 90 mechanical degrees from the soft stator pole, the stator poles being supplied with magnetic flux from the energizing winding such that, upon energization of said winding, the rate of flux build-up in the hardened pole is less than that in the soft pole, to provide the machine with a unidirectional starting characteristic; and

a housing of nonmagnetic material disposed about the ener-

gizing winding, the magnetic stator flux from the soft stator pole following a nonmagnetic return which extends across said rotor directly to another of said stator poles and then back through the housing and the surrounding atmosphere to said soft pole.

4,087,710

PULSE TRAIN DISC

Wilhelm von Fabris, Neubiberg, and Peter Wentzel, Augsburg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Feb. 22, 1977, Ser. No. 770,293

Claims priority, application Germany, Mar. 31, 1976, 7610024[U]

Int. Cl.² H02K *19/20*

U.S. Cl. 310—168 **4 Claims**

1. A clock disc for use with a field plate differential sensing element having a predetermined width, said clock disc comprising:

a disc of soft magnetic material having an axis of rotation,

at least one tooth at the periphery of said disc defined by a pair of radial cuts in the edge of said disc spaced apart a distance greater than the predetermined distance to form a flap,

said flap displaced from the plane of the disc such that said disc is balanced when rotated about its axis.

4,087,711

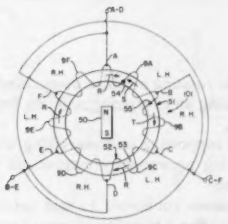
ROTATING ELECTRIC MACHINE HAVING A TOROIDAL-WINDING ARMATURE

James L. Kirtley, Jr., Brookline, and Joseph L. Smith, Jr., Concord, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 517,289, Oct. 22, 1974, abandoned, which is a continuation of Ser. No. 372,129, Jun. 21, 1973, abandoned. This application Feb. 27, 1976, Ser. No. 661,912

Int. Cl.² H02K *3/00*

U.S. Cl. 310—184 **17 Claims**



1. A rotating electric machine that comprises, in combination a field rotor, an armature having a toroidal core and a continuous closed loop high voltage polyphase winding on the core that comprises a plurality of sectors disposed end-to-end circumferentially around the rotor, said sectors being interconnected in immediate adjacency circumferentially to one another to form a winding which establishes a substantially continuous voltage gradient circumferentially, immediately adjacent sectors of the closed-loop polyphase winding being wound in alternating left and right hand sense to provide, in an operating machine, magnetic flux linkage in each sector which is oppositely directed to the flux linkage in sectors immediately adjacent thereto, insulation between adjacent turns of said winding being only that necessary to electrically insulate at most only a few times the volts per turn rating of the machine.

4,087,712

METHOD OF PRODUCING WINDINGS FOR ELECTRICAL MACHINES AND APPLIANCES

Hans Mosimann, and Werner Marti, both of Breitenbach, Switzerland, assignors to Schweizerische Isola-Werke, Breitenbach, Switzerland

Filed Jun. 18, 1976, Ser. No. 697,533

Claims priority, application Switzerland, Jun. 19, 1975, 8010/75

Int. Cl.² H02K *3/36*

U.S. Cl. 310—215 **22 Claims**

1. A method of forming windings on magnetizable cores for small electrical machines, wherein said cores have a plurality of openings for receiving said windings, said method comprising the steps in sequence of:

(a) lining said openings with a slot liner formed of a material selected from the group consisting polyester sheet, laminates of polyester sheet and laminated fiber sheet, paper made from polyamide fibers, and asbestos paper, said slot liner being coated on at least the side facing the magnetizable core with at least one B-state resin which (i) is completely non-tacky at room temperature but (ii) is capable of being cured and of becoming tacky at elevated temperatures,

(b) randomly winding said core with a thermosetting adhesive varnished wire, and

(c) heating said wound core so as substantially simultaneously to cure said coating on said slot liner and said adhesive on said wire and to bond said liner to said core and said wire to said liner.

12. A wound core for a small electrical machine and comprising in combination:

a magnetizable core having a plurality of slots formed thereon,

thermosetting adhesive varnish coated wires randomly wound in said slots, and

a laminate of polyester sheet and fiber sheet lining said slots between said core and said wires, said laminate being coated with a B-state resin which (i) is non-tacky at room temperature but (ii) is capable of being cured and of becoming tacky at the thermosetting temperature of the adhesive varnish on said wire.

4,087,713

SLIP-RINGLESS CLAW-POLE DYNAMO ELECTRIC MACHINE, PARTICULARLY AUTOMOTIVE-TYPE ALTERNATOR

Georg Binder, Stuttgart, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 9, 1976, Ser. No. 712,835

Claims priority, application Germany, Sep. 27, 1975, 2543196

Int. Cl.² H02K *1/22*

U.S. Cl. 310—266 **15 Claims**

1. Slipring-less dynamo electric machine having

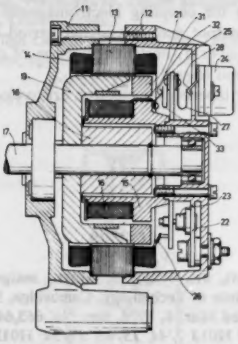
a frame including a stator and having an armature core (13) and an armature winding thereon, and a field core (15) and a field winding (16) thereon, radially spaced from the armature winding and defining a cylindrical gap therewith;

end bells (11, 12) securing said armature core and said field core in position in the machine;

a rotor including a claw pole (19) extending into the gap between the armature and the field windings, and an inner pole (18) surrounding the shaft (17) of the machine,

terminal support means (24, 25) secured to the frame of the machine;

and means to connect the winding ends of the field winding (16) with the associated terminals on the terminal support



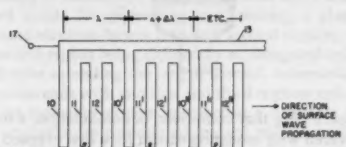
means comprising resiliently engaged compression contact elements (32, 33, 35).

4,087,714

THREE PHASE UNIDIRECTIONAL TRANSDUCER

Richard La Rosa, South Hempstead, N.Y., and Gerald A. Aiello, Barboursville, Va., assignors to Hazeltine Corporation, Greenlawn, N.Y.

Filed Oct. 18, 1971, Ser. No. 189,997
Int. Cl.[2] H01L *41/04*
U.S. Cl. 310—313 15 Claims



1. A multiterminal acoustic surface wave transducer having a unidirectional response characteristic over a selected operating frequency band and capable of launching and receiving surface waves in a body of piezoelectric material, comprising:

a set of *n* parallel electrodes (where *n* is an integer greater than 2) arranged on one surface of said material with a center-to-center electrode spacing equal to $1/n$ wavelength of a selected frequency within said frequency band, each electrode forming a terminal of said multiterminal transducer;

means for supplying an *n* phase electrical signal to the terminals of said transducer with a $360°/n$ phase separation between terminals, thereby causing said transducer to launch a corresponding surface wave in said material in the direction of phase progression among said electrodes.

4,087,715

PIEZOELECTRIC ELECTROMECHANICAL MICROPOSITIONER

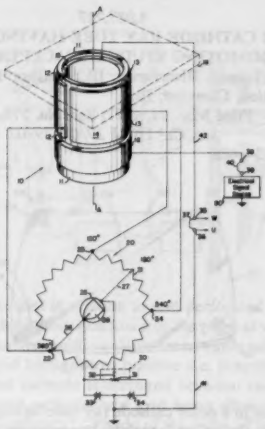
Jon H. Myer, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 18, 1976, Ser. No. 742,926
Int. Cl.[2] H01L *41/04*
U.S. Cl. 310—317 19 Claims

1. An electromechanical micropositioner, comprising the combination;

a tubular piezoelectric member;

a plurality of arc-shaped electrically conductive coatings disposed on a first surface of the member electrically insulated from each other and a first endless electrically conductive coating disposed on a second surface opposite from the first surface of the member;



a second endless electrically conductive coating disposed over a portion of said first surface; and

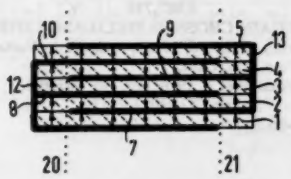
a first potentiometer having an endless winding with taps at regular intervals, equal in number and connected to the plurality of arc-shaped coatings, one tap per arc-shaped coating.

4,087,716

MULTI-LAYER ELEMENT CONSISTING OF PIEZOELECTRIC CERAMIC LAMINATIONS AND METHOD OF MAKING SAME

Walter Heywang, Neukeferloh, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 31, 1976, Ser. No. 719,093
Claims priority, application Germany, Sep. 22, 1975, 2542228
Int. Cl.[2] H01L *41/04*
U.S. Cl. 310—332 1 Claim



1. A multi-layer element comprising

a plurality of piezoelectric ceramic layers stacked one upon the other including a first end layer and a second end layer,

a plurality of metal layers, a first of said metal layers carried on the outer surface of said first end layer of the stack, a second metal layer carried on the outer surface of said second end layer of the stack, and the other metal layers intermediate said ceramic layers, alternate ones of said metal layers overlapping in a central portion of the stack, the stack having portions outboard of the overlapped portions,

a first electrical connection between said first metal layer and some of said other metal layers,

a second electrical connection between said second metal

layer and the alternate metal layers between said some metal layers,

adjacent piezoelectric layers polarized in opposite directions in the central portion of the stack, and

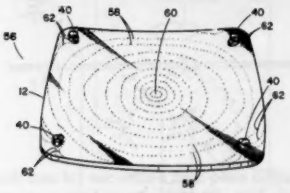
all of said piezoelectric layers polarized in the same direction in the outboard portions of the stack.

4,087,717

COLOR CATHODE RAY TUBE HAVING LAMINAR FLOW PROMOTING STUDS IN FACEPLATE CORNERS

Martin L. Lerner, Riverforest, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Mar. 21, 1977, Ser. No. 779,439
Int. Cl.² H01J *29/07, 29/02*
U.S. Cl. 313—406 **4 Claims**



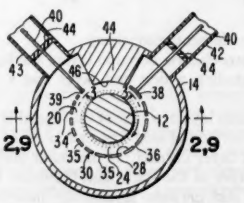
1. For use in a color cathode ray tube having a substantially rectangular, flangeless faceplate, the inner surface of which is adapted to receive by a radial flow suffusion process at least one coating of a phosphor-bearing, air-drying screening fluid, and having a substantially rectangular shadow mask assembly suspended adjacent to said faceplate by a plurality of metal studs spaced about the periphery of said shadow mask assembly and outside the viewing area of said faceplate, with a part of each of said studs embedded in said inner surface of said faceplate and with the distal end of each detachably engaged to said shadow mask assembly, said studs each being characterized by having an intermediate part between the embedded part and said distal end which has in its cross-section a non-circular profile tapering gradually in a radially inward direction to a blunt extremity so as to present to radially out-rushing screening fluid an initially narrow, gradually expanding profile which promotes laminar flow of said screening fluid around said stud during said radial flow suffusion process to inhibit screening fluid washback and consequent formation of permanent, visible wave patterns in said coating upon drying.

4,087,718

HIGH GAIN CROSSED FIELD AMPLIFIER

George K. Farney, Boxford, Mass., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed May 6, 1976, Ser. No. 683,990
Int. Cl.² H01J *25/34*
U.S. Cl. 315—39.3 **6 Claims**



1. A crossed-field amplifier comprising:

a periodic slow-wave circuit extending over a path between an input end and an output end, cathode means spaced from said circuit and extending over the length of said path, said cathode means applied to operate at a potential negative to said circuit and to generate a stream of electrons between said cathode and said circuit, means for coupling electromagnetic wave energy into said input end, means for coupling electromagnetic wave energy from said output end, the spatial period of said circuit decreasing over a substantial portion of said path from said input end to said output end;

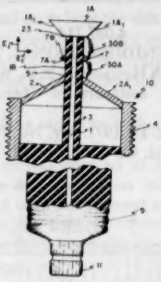
and means for tapering the electron drift velocity along said path.

4,087,719

SPARK PLUG

George W. Pratt, Jr., Wayland, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 4, 1976, Ser. No. 663,648
Int. Cl.² H01J *7/44, 13/46, 17/34;* H01K *1/62*
U.S. Cl. 315—45 **27 Claims**



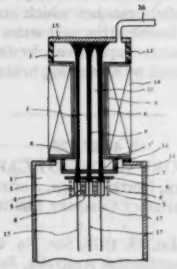
1. A spark plug that comprises, in combination, a first electrode covered with insulation except for a first exposed portion to which electrical contact is made to an ignition system and for a second exposed portion which has a first sparking surface, said first sparking surface acting to initiate or terminate one end of the electric discharge associated with the energized plug, a plug body which serves as grounding means and which is connected to a second sparking surface, said plug body being concentric with said first electrode, said second sparking surface serving to initiate or terminate another end of said electric discharge, said first sparking surface and said second sparking surface being generally conical in shape, the axes of the cones coinciding with the axis of said first electrode, the apex of the two cones facing each other along the plug axis, the cone angles being chosen so that the lines of electrical force entering or leaving said conical sparking surfaces are directed so that the electric discharge of the energized plug is forced radially outward from the plug axis away from the surface of said insulation, at least one floating electrode having a pair of associated sparking surfaces disposed about said insulation and located between the first and second sparking surfaces, there being a spark gap between one of said associated sparking surfaces and the second sparking surface and a further spark gap between the other of said associated sparking surfaces and the first sparking surface, said associated sparking surfaces acting to terminate and initiate a portion of the electric discharge passing between said first sparking surface and said second sparking surface, the first sparking surface, the second sparking surface and the associated sparking surfaces being so shaped, positioned and oriented that current flowing in an arc between any two sparking surfaces in an operating spark plug interacts electromagnetically with current carried by the first electrode to force the arc away from said insulation.

4,087,720

MULTI-BEAM, MULTI-APERTURE ION SOURCES OF THE BEAM-PLASMA TYPE

Toshinori Takagi, Nagaokakyo, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 5, 1976, Ser. No. 729,825
Claims priority, application Japan, Oct. 8, 1975, 50/121906
Int. Cl.[2] H05H *1/00*
U.S. Cl. 315—111.9 5 Claims



1. A multi-beam, multi-aperture ion source of the beam-plasma type which generates high density ions by utilization of microwave oscillation caused by interactions between electron beams and a plasma, said ion source comprising:

housing means defining first, second and third regions, said second region being in mutual communication with said first and third regions;

said first region including a focusing lens system including a plurality of cathodes, a Wehnelt cathode and a multi-apertured anode for generating and emitting a plurality of focused electron beams into said second region;

said second region being defined by an elongated cylindrical drift tube extending the length thereof, communicating at opposite ends with said first and third regions and containing an ionizable gaseous medium at a sufficient pressure for ionization to provide an ionized plasma, said second region further including means for inducing microwave energy oscillations therein to establish wave modes in said plasma which interact with said electron beams and said electron beams traversing the length of said drift tube in a pattern defining a well of negative potential trapping said ions in said second region into focussed ion beams propogating in the opposite direction to said electron beams; and

said third region including a collector plate for receiving and collecting said electron beams from said second region and a source of ionizable material for supplying the latter to said second region;

said high density focussed ion beams being emitted from said second region through the said focussing lens system of said first region simultaneously with and in a direction opposite to the emission of said electron beams.

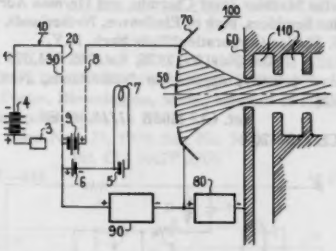
4,087,721

ION SOURCE USING A HOLLOW CATHODE DISCHARGE ARRANGEMENT AND IN PARTICULAR A PARTICLE ACCELERATOR COMPRISING SUCH A SOURCE

Georges Mourier, Paris, France, assignor to Thomson-CSF, Paris, France

Filed May 13, 1976, Ser. No. 687,087
Claims priority, application France, May 16, 1975, 75 15440
Int. Cl.[2] H01J *27/00*
U.S. Cl. 313—230 4 Claims

1. An ion source, wherein a hollow cathode discharge arrangement is comprised, in a mass of ionisable gas, of two cathodes arranged opposite one another and an anode spaced apart from said cathodes and facing the space delimited by the same, and means for bringing this anode to a positive d.c. control potential V in relation to said cathodes under the effect of which the gas is ionised and a sheet of plasma formed, this sheet of plasma extending between the cathodes at a certain distance from each of them up to the anode; wherein one of said cathodes is formed with holes through which some of the ions of the plasma escape; wherein a hot filament brought to a



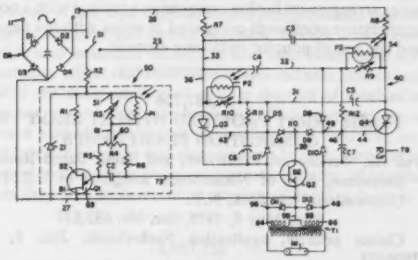
negative d.c. potential in relation to said perforated cathode is placed in the path of these ions towards the point at which they are used, said filament emitting electrons towards said cathode, and wherein a grid brought to a positive d.c. potential relative to said perforated cathode is arranged between said filament and said perforated cathode, said grid being situated at a distance from said perforated cathode of the order of the distance separating said plasma from said perforated cathode.

4,087,722

APPARATUS AND METHOD FOR SUPPLYING POWER TO GAS DISCHARGE LAMP SYSTEMS

Bruce J. Hancock, Mesa, Ariz., assignor to American Ionetics, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 573,478, May 1, 1975, abandoned, which is a continuation-in-part of Ser. No. 451,362, Mar. 15, 1974, abandoned. This application Jul. 26, 1976, Ser. No. 708,430
Int. Cl.[2] H05B *41/392, 37/02*
U.S. Cl. 315—200 A 7 Claims



1. Apparatus for supplying variable power to a discharge gas lamp load to vary the brightness in lamp elements of said load which includes, in combination:

(a) Means for rectifying commercial alternating current of relatively low frequency to obtain a direct current supply;

(b) A primary oscillator for converting said direct current supply to high frequency substantially square wave pulses;

(c) A transformer having a primary winding for receiving said pulses and a secondary winding for supplying alternating current from said pulses to said lamp load;

(d) Means for conducting said pulses to the transformer primary winding, including a pair of alternatly conducting Silicone Control Rectifiers, and

(e) A control circuit including means responsive to variations in ambient light for selectively changing the width of

said pulses by controlling the on and off times of said Silicone Control Rectifiers, thereby to vary and control the power conducted to said transformer in response to said variations in said ambient light.

4,087,723

ARRANGEMENT FOR STARTING AND OPERATING A DISCHARGE LAMP

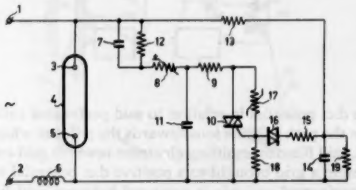
Hubertus Mathias Jozef Chermin, and Herman Adrianus Godefridus Smulders, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 12, 1976, Ser. No. 741,377

Claims priority, application Netherlands, Nov. 21, 1975, 7513609

Int. Cl.² H05B *41/18, 41/36*

U.S. Cl. 315—207 **8 Claims**



1. An arrangement for starting and operating a discharge lamp having at least two main electrodes comprising, two input terminals adapted for connection to an alternating voltage source, an inductive ballast, means connecting a first series arrangement comprising said inductive ballast and the lamp across the two input terminals, means interconnecting the two main electrodes of the lamp by means of a starter circuit comprising a second series arrangement including at least a capacitor and a controlled semiconductor switching element having a bidirectional thyristor characteristic, the capacitance of the capacitor being chosen so that during the starting procedure of the lamp, with the semiconductor switching element conducting, the value of the voltage produced between the main electrodes of the lamp is more than 1.1 times that of the voltage between the input terminals of the arrangement, the second series arrangement further comprising a resistor with a positive temperature coefficient connected in series with the capacitor and the semiconductor switching element.

4,087,724

FLASH ARRAY PROVIDED WITH AT LEAST TWO COMBUSTION FLASH LAMPS

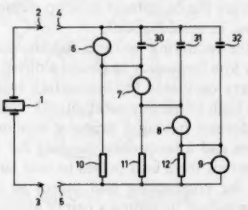
Jan van Werkhoven, Eindhoven, and Bauke Jacob Roelevink, Terneuzen, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 5, 1976, Ser. No. 683,537

Claims priority, application Netherlands, Jun. 5, 1975, 7506653

Int. Cl.² H05B *41/34;* F21K *5/02*

U.S. Cl. 315—323 **9 Claims**



5. A flash array for cooperation with an associated voltage source which supplies a pulse-shaped voltage which comprises: first and second electrical input terminals, for connection to the associated voltage source, first and second combustion flash lamps connected in parallel to said input terminals, means for igniting said bulbs in succession, said means including first fusable strip which opens when said first lamp is flashed, said second lamp and said first fusable strip being connected in parallel branches, said lamps being high voltage combustion flash lamps, said input terminals being connected by means of a series circuit of a mainly capacitive circuit element and said parallel branches which comprise said second lamp and said first fusable strip, said series circuit which comprises both the mainly capacitive circuit element and said second lamp is shunted by a shunting branch which comprises said first lamp.

4,087,725

COKE OVEN HOT CARS

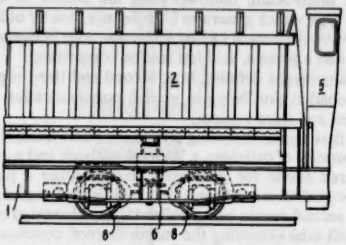
Patrick Marion Burn, North Balwyn, Australia, assignor to The Broken Hill Proprietary Company Limited, Melbourne, Australia

Filed Jul. 15, 1974, Ser. No. 488,760

Claims priority, application Australia, Jul. 16, 1973, 4094/73

Int. Cl.² H02P *7/68*

U.S. Cl. 318—52 **6 Claims**



1. In a coke quenching system: a pair of rails which are inherently liable to be wet and contaminated during operation of the system; a rail car for carrying hot coke from a coke oven to a quenching station including a chassis supporting a coke container, a plurality of wheeled axles, including a pair of forward axles, supporting said chassis and only said chassis at spaced-apart locations along the length of the chassis, said pair of forward axles being located under the forward end of the coke container so that the wheels of said forward axles have high tractive advantage when the container is loaded with coke; electric motors carried by the chassis drivingly connected to said forward axles; and a control system for said rail car including a speed regulator circuit for regulating both forward and reverse torques through said motors, and a slip detection circuit for generating a signal on any significant speed mismatch between said motors, said signal being applied to said speed regulator circuit to modify the regulation applied to remove wheel slip.

4,087,726

CONSTANT-FREQUENCY CURRENT CHOPPERS FOR LOW-RATE SUPPLY OF AN INDUCTIVE LOAD

Alain P. Bourguet, Montmorency, and Philippe L. Gantois, Noisy le Sec, both of France, assignors to Jeumont-Schneider, Puteaux, France

Filed Jul. 21, 1976, Ser. No. 707,710

Claims priority, application France, Aug. 7, 1975, 75 24671

Int. Cl.² H02P *5/16*

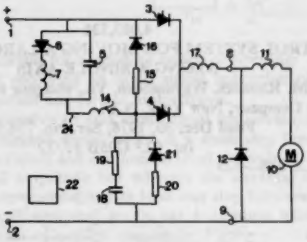
U.S. Cl. 318—345 G **11 Claims**

1. In a constant-frequency current chopper connected between a voltage source and a load for low-rate supply of such load and comprising: a main thyristor, shunted by a cutoff circuit including therein a cutoff thyristor in series connection

with a cutoff capacitor in a resonating discharge circuit having a first thyristor, and a control circuit means for controlling conductivity of said main, cutoff and first thyristors, each thyristor herein or hereafter recited having anode, cathode and gate terminals, said chopper being connected between a first terminal of said voltage source and said load, the improvement comprising:

a. additional discharge means for discharging said cutoff capacitor, said additional discharge means being connected across said cutoff capacitor, and

b. decoupling means connected between said chopper and a second terminal of said voltage source for preventing excessively rapid variation of voltages applied to said thyristors,



c. wherein said control circuit means provides low current values to said load by providing for conductivity of said cutoff thyristor during a time when said additional discharge means is discharging said cutoff capacitor,

d. wherein said control circuit means provides increased current to said load by providing for said conductivity of said cutoff thyristor at earlier times during said discharge of said cutoff capacitor by said additional discharge means, and

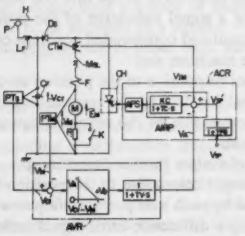
e. wherein said control circuit means provides larger current values to said load by providing for conductivity of said main thyristor prior to providing for conductivity of said cutoff thyristor.

4,087,727

REGENERATIVE BRAKE CONTROL SYSTEM FOR DC MOTOR

Michimasa Horiuchi, Mito, and Hiroshi Narita, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 30, 1976, Ser. No. 745,998
Claims priority, application Japan, Dec. 17, 1975, 50-149519
Int. Cl.[2] H02P 3/14
U.S. Cl. 318—376 **7 Claims**



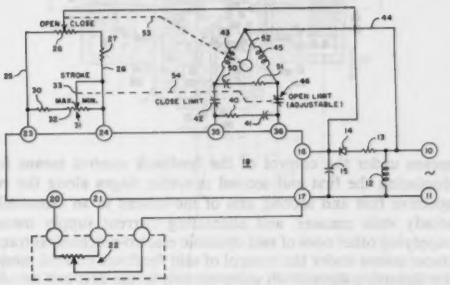
1. A regenerative brake control system for a DC motor, comprising a DC motor; resistor means connected in series to said DC motor; switch means for short-circuiting said resistor means; chopper means connected in parallel to a series circuit including said DC motor and said resistor means for controlling the armature current of said DC motor by on-off operation of said chopper means; means for regulating the duty cycle of said chopper means; a filter circuit being connected through a diode to a parallel circuit including said chopper means and said series circuit; and a power supply connected to said filter circuit; said short-circuiting switch means failing to operate within a predetermined range of the difference between an equivalent source voltage taking into consideration the minimum duty cycle of said chopper and the motor voltage less the voltage drop across the resistor.

4,087,728

ADJUSTABLE STROKE ELECTRIC MOTOR USING STROKE ADJUSTING LINKAGE MEANS

Richard B. Porter, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 24, 1976, Ser. No. 744,670
Int. Cl.[2] H02P 3/00
U.S. Cl. 318—466 **8 Claims**



1. In an adjustable stroke electric motor, including: electric motor means having limit switch means responsive to rotation of said motor means to safely limit the rotation of said motor means to a predetermined number of angular degrees; electric circuit means for controllably energizing said motor means with said circuit means including stroke adjusting resistance means; said stroke adjusting resistance means being capable of being adjusted to cause said electric circuit means to control the rotation of said motor means to said predetermined number of angular degrees; and stroke adjusting linkage means connected to said resistance means and said limit switch means to concurrently adjust said resistance means and said limit switch means to the same number of angular degrees of rotation of said motor means to limit the operation of said motor means in the event said electric circuit means becomes defective and would thereby energize said motor means in such a way as to cause said motor means to rotate a greater number of angular degrees than said predetermined number of angular degrees.

4,087,729

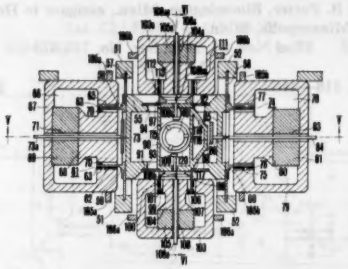
POSITION FINELY ADJUSTING APPARATUS

Shin-ichi Yamazaki, Chofu; Makoto Asakawa, Mitaka, and Tadao Saito, Koganei, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation, Japan

Filed Apr. 20, 1976, Ser. No. 678,673
Claims priority, application Japan, Apr. 21, 1975, 50-48444
Int. Cl.[2] G05B 19/28
U.S. Cl. 318—601 **27 Claims**

1. Fast acting composite coarse and fine position adjusting apparatus comprising a stationary frame, first and second movable stages respectively arranged to be movable along first and second axes intersecting at right angles in a plane, dynamic electro-mechanical transducer means mounted on respective axial ends of the respective stages, first resilient supporting means for supporting said first stage on said stationary frame to be movable in the direction of said first axis, second resilient supporting means mounted on said first stage for supporting

said second stage to be movable in the direction of said second axis, means mounted on said second stage for supporting an object whose position is to be adjusted within very fine tolerances, combined coarse and fine position measuring electrode means coacting with the respective stages for deriving output electric signals representative of the position of the respective stages, feedback control means responsive to the output electric signals from the position measuring electrode means for controlling operation of said dynamic electro-mechanical transducer means, direct current supply means supplying selected ones of the dynamic electro-mechanical transducer



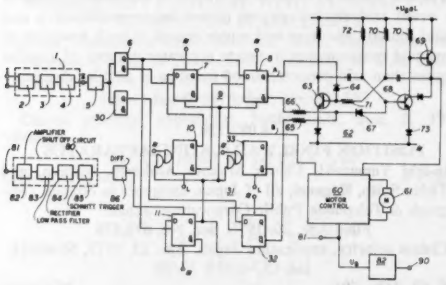
means under the control of the feedback control means for displacing the first and second movable stages along the respective first and second axis of movement in an essentially steady state manner, and alternating current supply means supplying other ones of said dynamic electro-mechanical transducer means under the control of said feedback control means for imparting limited vibratory motion to the first and second stages along their respective axis of movement whereby the position measuring electrode means is enabled to derive output electric signals representative of the position of the respective stages over a wide range of displacement and the position of the stages is adjusted within very fine tolerances.

4,087,730

ELECTRIC CONTROL CIRCUIT

Norbert Goles, Vienna, Austria, assignor to Viennatone Gesellschaft m.b.H., Vienna, Austria

Filed Sep. 20, 1976, Ser. No. 725,106
Claims priority, application Austria, Sep. 18, 1975, 7184/75
Int. Cl.² G05B *19/28;* A61F *1/00*
U.S. Cl. 318—603 **10 Claims**



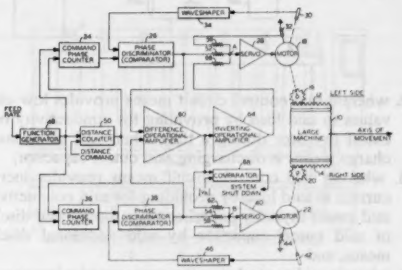
1. Control apparatus for activating at least one output control element in response to a myoelectric input signal, comprising, in combination, threshold circuit means responsive to said myoelectric input signal for furnishing a threshold output signal while said myoelectric input signal has an amplitude exceeding a predetermined amplitude; timing means connected to said threshold means, for furnishing a timing signal for a predetermined time interval following receipt of said threshold output signal; comparator means connected to said threshold circuit means and said timing circuit means for furnishing a first comparator output signal when the duration of said threshold output signal exceeds said predetermined time interval and a second comparator output signal when the duration of said threshold output signal is less than said predetermined time interval; and connecting means for connecting said output control element to said comparator means in such a manner that the operation thereof is dependent upon said first and second comparator output signals.

4,087,731

CONTROL SYSTEM FOR MOVING A LARGE MACHINE ALONG A SINGLE AXIS

John M. Rhoades, Waynesboro, Va., assignor to General Electric Company, New York, N.Y.

Filed Dec. 30, 1976, Ser. No. 756,025
Int. Cl.² G05B *11/32*
U.S. Cl. 318—625 **3 Claims**



1. A control system for driving at least first and second motors to move a large machine along a single axis, said control system including at least first and second position loop servo systems driving the respective first and second motors to move respective first and second sides of the machine in the direction of the single axis, each position loop servo system comprising:

(a) means for generating a first signal indicative of the commanded position of movement that the machine is to be moved by the respective motor;

(b) means for generating a second signal indicative of the actual position of the respective side of the machine moved by that motor;

(c) means responsive to the first and second signals for generating a signal indicative of the position error between the actual and commanded positions of the respective side of the machine; and

(d) means responsive to the position error signal to generate a signal for driving the respective motor for moving the respective side of the machine toward the commanded position;

said control system further comprising:

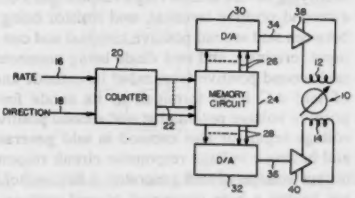
(A) means responsive to the position error signals generated by each said position loop servo system for generating a difference error signal indicative of the difference between the actual position of each respective side of the machine along the single axis; and

(B) means for coupling the difference error signal to said driving means for one of the motors for causing a change in movement of that motor in a direction to move each side of the machine toward the same actual position, whereby to cause the difference error signal to be reduced toward zero.

4,087,732
DIGITAL STEPPING MOTOR DEVICE CIRCUIT

Eric K. Pritchard, Bowie, Md.

Filed May 21, 1976, Ser. No. 688,628
Int. Cl.[2] G05B 19/40
U.S. Cl. 318—696 10 Claims

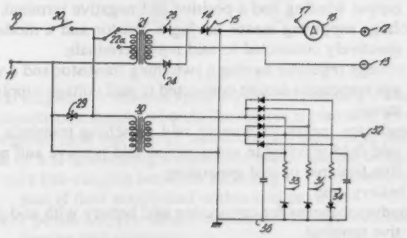


1. A control circuit for a stepping motor comprising:
(a) means for receiving an input signal indicative of the desired direction and rate of motor travel,
(b) means responsive to said input signal for developing a position command signal which is a multi-step function having a maximum and a minimum level, wherein all steps are of equal amplitude but wherein the duration of all steps is predetermined and at least one step between said maximum and minimum levels has a duration which is unequal to that of another step, and
(c) means responsive to said position command signal for developing an energization signal for said stepping motor.

4,087,733
BATTERY CHARGER

Serge Casagrande, Windsor, Canada, assignor to Controlled Systems (Windsor) Limited, Windsor, Canada

Filed May 18, 1976, Ser. No. 687,461
Claims priority, application Canada, Jul. 29, 1975, 232415
Int. Cl.[2] H02J 7/04
U.S. Cl. 320—21 2 Claims

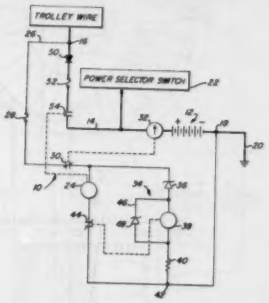


1. A battery charger comprising a source of unidirectional current pulses adapted to be supplied to a battery,
a controllable switching device in series with said current source,
a timing capacitor,
a controllable current source operating in synchronism with the current pulses and connected to the timing capacitor,
a gating circuit including a unijunction transistor with its emitter circuit connected to the timing capacitor, producing control pulses coupled to said switching device to place it in conduction for a portion of the period of each unidirectional current pulse, said control pulses being in synchronism with said current pulses but having a variable period with respect thereto,
a battery voltage responsive control circuit producing a signal indicative of the difference between the battery voltage and a reference voltage, said signal being coupled to the controllable current source to control the charging rate of said capacitor,
transistor switching means coupled to the controllable current source to override the signal from the voltage control circuit and place said controllable current source in a condition of maximum supply, and timer means controlling said transistor switching means to limit the period of maximum supply.

4,087,734
CHARGING CIRCUIT FOR COMBINATION TROLLEY AND BATTERY POWERED LOCOMOTIVES

Joachim N. Blutreich, Ashland, Ky., assignor to National Mine Service Company, Pittsburgh, Pa.

Filed Sep. 29, 1975, Ser. No. 617,941
Int. Cl.[2] H02J 7/00
U.S. Cl. 320—28 9 Claims



1. An electrical circuit for charging a mining machine battery from the voltage of a trolley wire comprising,
control means connected to said trolley wire and said battery for controlling the supply of direct current power from said trolley wire to said battery to permit charging of said battery to a preselected voltage level,
voltage sensing means for monitoring the level of the voltage of said trolley wire, said voltage sensing means being connected in parallel relation with said control means in said circuit,
a monitoring relay connected in series relation with said voltage sensing means for terminating flow of current from said trolley wire to said battery,
said voltage sensing means being operable to actuate said monitoring relay to terminate current flow to said battery when the trolley wire voltage exceeds a preselected voltage level and to continue current flow to said battery when the trolley wire voltage remains below said preselected trolley wire voltage, and
metering means connected to the battery between the trolley wire and the battery for interrupting the flow of current through said control means after a predetermined charging interval to deenergize said control means and terminate the flow of current to said battery after a preselected charge has been applied to said battery.

4,087,735
SOLAR ELECTRIC GENERATION USING VARIABLE CAPACITORS

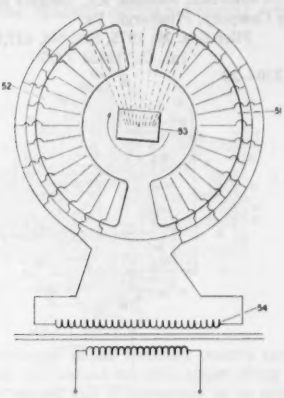
Louis O'Hare, 1041 Ponderosa, Apt. 2, Fort Collins, Colo. 80521

Filed Mar. 4, 1976, Ser. No. 663,927
Int. Cl.[2] H02N 1/00; G01T 1/00
U.S. Cl. 322—2 A 6 Claims

1. An improved method of generating electric power from radiant energy comprising:
Periodically changing the effective dielectric constant in two electric condensers' dielectric material, simultaneously elevating the dielectric constant of one while depressing that of the other by causing the periodic in-

crease in the electron polarization of one condenser while simultaneously causing the decrease in electron polarization of the opposite condensers' dielectric by the periodic admission of electromagnetic radiation first to the one condensers' dielectric then to the others dielectric and by alternating periods of admission and exclusion of radiation to each condenser, one receiving it while the other does not,

employing a set of two such condensers constantly changing in opposite directions from each other with respect to



their dielectric constants when under the influence of radiation that cycles back and forth from the dielectric of one to the dielectric of the other in a series electric circuit with a transformer,

placing a charge on the condensers occasionally and removing the source of the charge,

continuously cycling said required radiation back and forth from one radiation sensitive dielectric to the other,

removing useful electric power from the secondary winding of said series connected transformer.

4,087,736

CURRENT GENERATING SYSTEM

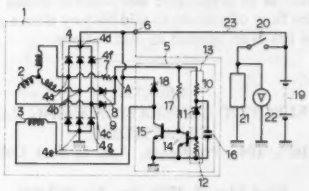
Kazumasa Mori, Aichi; Toshio Morishima, Kariya, and Katsumi Itoh, Ohbu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 21, 1976, Ser. No. 707,259

Claims priority, application Japan, Jul. 22, 1975, 50-89858; Oct. 3, 1975, 50-123393; Oct. 3, 1975, 50-123394; Oct. 3, 1975, 50-123396

Int. Cl.[2] H02J *7/16;* H02K *1/00*

U.S. Cl. 322—28 **5 Claims**



1. A current generating system comprising:

a battery;

a generator having a generator housing with a single output terminal connected to said battery, said generator having in said generator housing an output winding and a field winding;

a rectifying device encased in said generator housing and having first positive and negative direct current output terminals and AC input terminals connected to said output winding for rectifying the output from said output winding into direct current, said positive direct current output terminal of said rectifying device being connected with said single output terminal of said generator housing, said rectifying device also having a resistor and a diode to form a second positive terminal, said resistor being connected between said second positive terminal and one of said AC input terminals, and said diode being connected between said second positive terminal at its cathode and the other of said AC input terminals at its anode for providing positive voltage potential at said second positive terminal;

a voltage regulator also encased in said generator housing and having a voltage responsive circuit responsive to the output voltage of said generator, a first switching transistor having a base connected to said voltage responsive circuit, and a second switching transistor having a base connected to the collector of said first switching transistor, the collector-emitter path of said second switching transistor being connected across said positive and negative direct current output terminals through said field winding; and

a conductor connecting said second positive terminal with both the collector of said first switching transistor and the base of said second switching transistor, said base of said second switching transistor being electrically isolated from said first positive direct current output terminal, whereby the base current for said second switching transistor is supplied from only said second positive terminal.

2. A current generating system comprising:

a generator having an output winding and a field winding, said generator further including a rotary shaft, a pair of pole cores carried by said rotary shaft, and a coil bobbin interposed between said pair of pole cores and enclosing said field winding therein, said coil bobbin being made of a low-carbon steel and being subjected to a cementation treatment;

a rectifier device having input terminals connected to said output winding and a positive and negative terminal;

voltage supplying means having a resistor and a diode respectively connected to said input terminals;

a voltage regulator having a switching transistor and a voltage responsive circuit connected to said voltage supplying means;

conductor means connecting said switching transistor and said field winding in series across said positive and negative terminal of said generator;

a battery; and

conductor means for connecting said battery with said positive terminal.

4,087,737

PHASE SHIFTING CIRCUIT

Cosmo Henry De Gennaro, Morris Plains, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 18, 1977, Ser. No. 788,139

Int. Cl.[2] H03F *1/34*

U.S. Cl. 323—108 **4 Claims**

4. A phase shifting circuit comprising

an operational amplifier having an inverting input port and an output port,

a first capacitor connected in series between said amplifier inverting input and output ports,

a circuit input terminal,

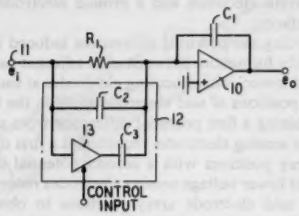
a resistor connected in series between said circuit input terminal and said amplifier inverting input port,

a second capacitor connected in series between said circuit input terminal and said amplifier inverting input port,

a signal-inverting, controllable-gain amplifier,

a third capacitor, and

means connecting said signal-inverting, controllable-gain amplifier and said third capacitor in series between said



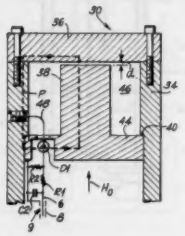
circuit input terminal and said operational amplifier inverting input port.

4,087,738

MAGNETIC RESONANCE DETECTION METHOD AND APPARATUS

Craig T. Van Degrift, Potomac, Md., and Donald B. Utton, Southampton, England, assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed Mar. 3, 1977, Ser. No. 774,094
Int. Cl.² G01R *33/08*
U.S. Cl. 324—.5 A **22 Claims**



1. Magnetic resonance apparatus for determining a magnetic property of a sample wherein the sample is placed in a varying magnetic field and energy transitions are induced in said sample by a rf field during a resonance in said sample comprising:

(a) a free-running oscillator including an LC resonant cavity, said rf field established within said cavity,

(b) power supply means connected to said oscillator for biasing said oscillator,

(c) means for placing said sample in a cavity region of said resonant cavity, and

(d) means for measuring the frequency of said oscillator as a function of said varying magnetic field during a resonance of said sample for determining from said frequency measurement the magnetic property of said sample.

4,087,739

EARTH FORMATION PERMEABILITY DETERMINING TECHNIQUE USING SYNTHETIC RESISTIVITY PARAMETERS

Julio Vieiro, Caracas, Venezuela, assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Jul. 22, 1974, Ser. No. 490,377
Int. Cl.² G01V *3/18*
U.S. Cl. 324—10 **2 Claims**

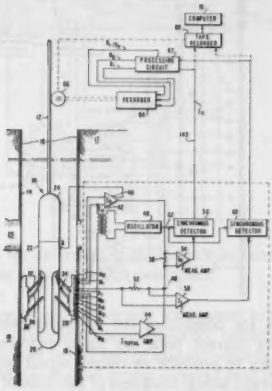
1. Apparatus for investigating subsurface earth formations traversed by a borehole comprising:

a. means for supporting a plurality of electrodes adapted for movement in a borehole, the plurality of electrodes including at least one current emitting electrode adapted to emit current into a borehole;

b. means for energizing said at least one current emitting electrode so that a main current controlled to flow primarily in the formation surrounding a borehole and an auxiliary current controlled to flow primary in a borehole and the formation immediately surrounding a borehole are emitted;

c. means for producing first and second signals that are functionally related to said main and auxiliary currents;

d. means for combining said first and second signals to produce first and second resistivity parameters that are functionally related to said signals and that provide an indica-



tion of the presence of permeable zones in the formation, said first resistivity parameter being related to at least said second signal and said second resistivity parameter being related to at least said first and second signals;

e. means for comparing said first and second resistivity parameters, said comparison means providing a comparison output signal which is indicative of the presence or absence of mudcake on the borehole wall; and

f. means for providing a signal representative of the resistivity of the mudcake on the borehole wall, means for providing a signal representative of the ratio of shallow resistivity to the mudcake resistivity, and means for coupling said ratio signal to said comparison means for activating said comparison means only when said ratio is less than 10.

4,087,740

SPHERICAL FOCUSING METHOD AND APPARATUS FOR DETERMINING THE THICKNESS OF A ZONE IN AN EARTH FORMATION TRAVERSED BY A BOREHOLE

Jean Suau, Saint-Cloud, France, assignor to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 324,906, Jan. 19, 1973, abandoned. This application May 6, 1975, Ser. No. 575,070
Int. Cl.² G01V *3/18*
U.S. Cl. 324—10 **14 Claims**

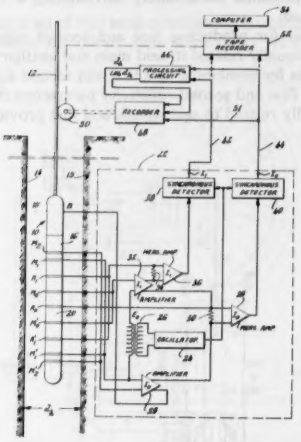
2. An apparatus for investigating earth formations traversed by a borehole comprising:

(a) means for supporting a plurality of electrodes adapted for movement in the borehole, the electrodes comprising at least one current-emitting electrode adapted for emitting current into the borehole, current return electrodes and a plurality of potential measuring electrodes;

(b) means for emitting a main current and an auxiliary current from said at least one current-emitting electrode;

(c) means for adjusting the potential difference between selected potential measuring electrodes to produce auxiliary current flows primarily in the media adjacent to the

electrodes and main current flow primarily in the formation surrounding the electrodes;
(d) means for measuring said main and auxiliary currents;
(e) means for combining the measurments of the main and auxiliary currents to produce a signal representative of the resistivity of a portion of the formation; and



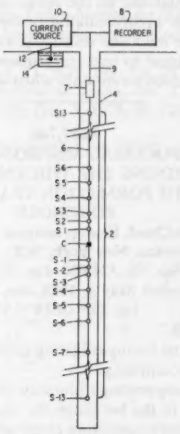
(f) means for combining the measurements of main and auxiliary current with the signal representative of the resistivity to produce an output signal representative of the average lateral thickness of the zone of the formation.

4,087,741

DOWNHOLE GEOELECTRIC REMOTE SENSING METHOD

Irshad R. Mufti, Tulsa, Okla., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Aug. 24, 1976, Ser. No. 717,307
Int. Cl.² G01V *3/18*
U.S. Cl. 324—10 **4 Claims**



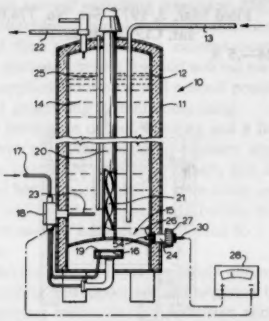
1. A method of exploring for electrically resistive geological anomalies lateral to but not penetrated by a borehole comprising:
traversing the borehole with an electrode array comprising a current electrode for passing current into earth formations cut by the borehole and a plurality of upper and a plurality of lower voltage sensing electrodes positioned above and below, respectively, the current electrode,
passing current into the earth formations by means of the current electrode and a ground electrode at the earth's surface;
recording the potential differences induced by said current in the formations between each adjacent pair of said upper and lower voltage sensing electrodes at each of a plurality of positions of said electrode array in the borehole, and
combining a first potential difference from said upper voltage sensing electrodes recorded at a first of said electrode array positions with a second potential difference from said lower voltage sensing electrodes recorded at a second of said electrode array positions to obtain a potential difference from which a symmetrical formation resistivity value may be determined.

4,087,742

HOT WATER HEATER CORROSION DETECTOR PROBE

Sian W. Khoo, Etobicoke, Canada, assignor to Canadian Gas Research Institute, Don Mills, Canada

Filed Jul. 21, 1975, Ser. No. 597,864
Int. Cl.² G01N *27/42*
U.S. Cl. 324—29 **10 Claims**



1. A hot water heater tank comprising an enclosed chamber having a substantially exposed iron interior surface, sacrificial anode means disposed in said chamber and in electrical contact with said iron interior surface operative to provide an electrochemical cathodic protection to said iron interior surface, an elongated non-sacrificial metal element formed of zinc or stainless steel mounted to said tank and being electrically insulated from said iron interior surface and extending into said chamber and operatively in contact with the water in said chamber whereby an electromotive force measurable between said metal element and said iron interior surface is indicative of the efficiency of the cathodic protection.

4,087,743

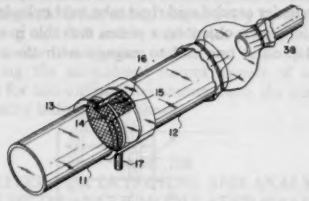
FOG-WATER CONDUCTIVITY MEASURING DEVICE

David J. Bressan, Forestville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 21, 1976, Ser. No. 707,408
Int. Cl.² G01N *27/42*
U.S. Cl. 324—30 R **13 Claims**

1. A fog-conductivity measuring system which comprises:
foggy air collector means;
means interconnected with said foggy air collector means for introducing a sample of foggy air into said foggy air collector means;
means within said foggy air collector means for separating fog water from the foggy air;
means for collecting said fog water;

means within said fog water collecting means for measuring the conductivity of said collected fog water during collection; and



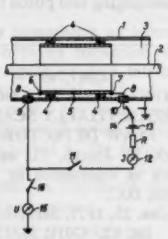
means for recording the measured conductivity of said collected fog water.

4,087,744

DEVICE FOR DETERMINING A HIGH-VOLTAGE POTENTIAL IN METAL-ENCAPSULATED HIGH-VOLTAGE SWITCHING INSTALLATIONS AND EQUIPMENT

Willi Olsen, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 21, 1976, Ser. No. 734,671
Claims priority, application Germany, Oct. 24, 1975, 2548173
Int. Cl.[2] G01R *31/02, 19/00*
U.S. Cl. 324—51 **3 Claims**



1. Apparatus for determining the high voltage potential on a conductor of a high voltage switching installation, the conductor carrying a high voltage and being supported by bodies of insulating material within a grounded metallic encapsulation, the apparatus comprising:

a measuring circuit;

an electrode disposed between the conductor and the encapsulation for delivering an electrical signal related to the potential on said conductor to said measuring circuit, said electrode including first and second electrode terminals situated at the ends thereof;

and test circuit means including:

first and second test circuit terminals, said second test circuit terminal being connected to said second electrode terminal;

a circuit connected between said first and second test circuit terminals and including a source of energy and a current-sensitive means for providing an indication of current flow through said circuit

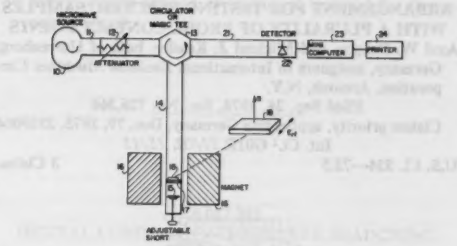
and switch means for selectively connecting said first test circuit terminal to said first electrode terminal and to said encapsulation whereby current flow through said circuit when said switch means connects said first test circuit terminal to said first electrode terminal provides an indication that said electrode is not in open circuit condition and the absence of current flow through said circuit when said switch means connects said first test circuit terminal to said encapsulation provides an indication that said electrode is not in a short circuit condition.

4,087,745

TECHNIQUE FOR CONTACTLESS CHARACTERIZATION OF SEMICONDUCTING MATERIAL AND DEVICE STRUCTURES

Thomas A. Kennedy, Jr., Oxon Hill, Md., and Bruce D. McCombe, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 28, 1977, Ser. No. 819,928
Int. Cl.[2] G01R *27/04*
U.S. Cl. 324—58 B **9 Claims**



1. Apparatus for determining carrier mobility and density in a semiconductor element which comprises:

a waveguide;

support means in said waveguide transparent to microwave power for supporting a semiconductor element;

a shorting element in one end of said waveguide for reflecting incident microwave power directed into the opposite end of said waveguide back through said waveguide;

magnetic field-producing means external to said waveguide, said support means, and said shorting element in said waveguide for producing a magnetic field along the axial direction of said waveguide;

a microwave source for producing microwave power;

means for directing microwave power from said source into said waveguide; and

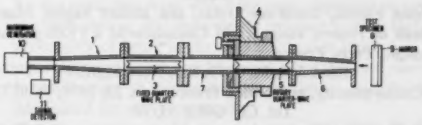
detector means for detecting and producing an output representative of the microwave power reflected back through said waveguide by said shorting element.

4,087,746

METHOD FOR DETERMINATION OF OPTICAL ANISOTROPY OF DIELECTRIC MATERIAL BY MICROWAVE

Yoshioki Kanae, Tachikawa, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Nov. 19, 1976, Ser. No. 743,125
Claims priority, application Japan, Nov. 20, 1975, 50-139403
Int. Cl.[2] G01R *27/04*
U.S. Cl. 324—58.5 A **1 Claim**



1. A method for the determination of the optical anisotropy of a dielectric material by means of a microwave, which method comprises producing a linearly polarized microwave by means of a microwave generator, converting said linearly polarized microwave into a circularly polarized wave with a fixed quarter-wave plate, causing said circularly polarized wave to impinge in the form of a linearly polarized wave upon a test specimen by means of a rotary quarter-wave plate, ad-

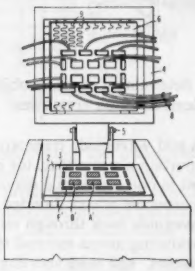
justing said plate in inclination so as to bring the inclination thereof into perfect agreement with the inclination of the major axis of an elliptically polarized wave generated during its passage through the test specimen for thereby converting said elliptically polarized wave into a resultant linearly polarized wave, measuring standing waves in two components of the linearly polarized waves, and consequently determining the inclination and the ellipticity of said elliptically polarized wave thereof on the basis of the measurement of the standing waves and the angle of said rotary quarter-wave plate.

4,087,747

ARRANGEMENT FOR TESTING ELECTRIC SAMPLES WITH A PLURALITY OF PROBE CONTACT POINTS

Axel W. Deegen, and Michael J. Kessler, both of Herrenberg, Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 24, 1976, Ser. No. 726,366
Claims priority, application Germany, Dec. 29, 1975, 2559004
Int. Cl.[2] G01R *31/02, 15/15*
U.S. Cl. 324—72.5 **3 Claims**



1. In an arrangement for testing electric samples, such as, circuit components, circuit assemblies, and circuit cards which have a plurality of probe contact points, the combination of:

a plurality of testing heads provided with testing tips in a large number and predetermined pattern which are adapted to be applied to said probe contact points;

control means electrically connected to said testing heads and tips;

a liftable and lowerable electromagnetic holding plate; and

a magnetizable support plate associated with each testing head for releasably mounting said testing heads onto said holding plate, said heads being arranged on the holding plate in accordance with the respective configuration of the sample to be tested and providing a flexible and universally applicable variable contact head.

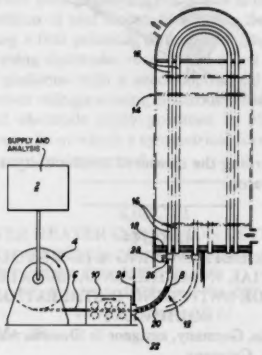
4,087,748

PNEUMATIC DRIVE DEVICE FOR A PROBE, PARTICULARLY AN EDDY CURRENT MEASURING PROBE

Michel Pigeon, Bures-sur-Yvette, and Robert Saglio, Massy, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 21, 1977, Ser. No. 761,075
Claims priority, application France, Jan. 22, 1976, 76 01728
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—220 **4 Claims**

1. A pneumatic drive device for a probe more particularly for an eddy current measuring probe, for driving said probe into a tube to be checked, comprising a tight flexible tube, a probe movable in said tube and connected to a cable, means for connecting one of the ends of said flexible tube to a pushing and pulling device for said cable, means for introducing a compressed fluid into said flexible tube between said pushing and pulling device and said probe to aid in driving said probe through said tube, and a cylinder-piston-restoring spring assembly at the other end of said flexible tube for connecting said tube to the tube to be checked comprising a rigid tube forming an extension of said flexible tube in which said probe can be moved, a cylinder around said rigid tube, said cylinder and said rigid tube defining a chamber, a piston movable in said chamber and adapted at one end to engage with the tube to be



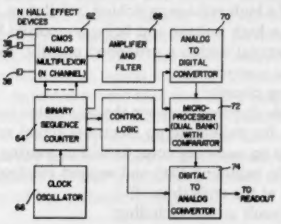
checked, a pipe connecting said chamber and said rigid tube to allow compressed fluid into said chamber and restoring springs between said piston and said cylinder, said compressed fluid engaging said piston beneath a tube to be checked and said restoring springs disengaging said piston from a tube which has been checked.

4,087,749

METHOD AND APPARATUS FOR NORMALIZING THE OUTPUTS OF SEQUENTIALLY SCANNED MAGNETIC FLAW DETECTORS

Ray G. McCormack, St. Joseph, Ill., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 25, 1977, Ser. No. 762,373
Int. Cl.[2] G01R *33/12*
U.S. Cl. 324—225 **5 Claims**



1. A method for detecting flaws in elongated objects such as conduits or the like comprising:

positioning an annular array of discrete magnetic field sensing devices transversely around a standard object which is known to have no flaws,

applying an electric current to the first object to flow longitudinally therethrough so as to create a magnetic field around the object,

sequentially scanning the magnetic field sensing devices to produce a first series of output signals corresponding to the magnetic fields sensed respectively by the devices,

storing the first series of output signals,

positioning the circular array transversely around the elongated object which is to be tested,

applying an electric current to the elongated object to be

tested to flow longitudinally therethrough so as to create a magnetic field around it,

sequentially scanning the magnetic field sensing devices to produce a second series of output signals corresponding to the magnetic fields sensed respectively by the devices,

comparing said first and second series of output signals in a comparator to normalize said second series of signals, and

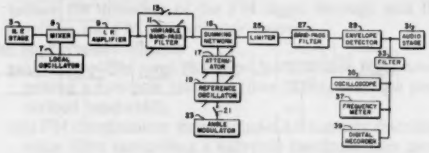
comparing the normalized output signals of said second series for non-uniformities among them, the non-uniformities being indicative of flaws.

4,087,750

RECEIVER FOR DETECTING AND ANALYZING AMPLITUDE OR ANGLE MODULATED WAVES IN THE PRESENCE OF INTERFERENCE

Joseph A. Allen, Eatontown, and William R. Fuschetto, Freehold, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 23, 1968, Ser. No. 731,662
Int. Cl.² H04B *1/10, 17/00*
U.S. Cl. 325—363 **7 Claims**



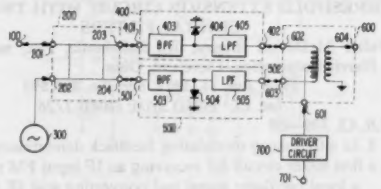
1. A radio receiver comprising, an intermediate frequency channel, a summing network connected to said channel for combining received signals in said intermediate frequency channel and a reference signal, said reference signal being adjustable in frequency and amplitude, and means for selectively angle modulating said reference signal, a wideband amplitude limiter connected to the output of said summing network, and means connected to the output of said limiter to detect frequency deviations outside of the passband of said intermediate frequency channel.

4,087,751

TRANSMITTER-RECEIVER CIRCUIT

Yasuo Kato, and Yoshio Matsuo, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Dec. 21, 1976, Ser. No. 753,163
Claims priority, application Japan, Dec. 26, 1975, 50-158893
Int. Cl.² H04B *1/52*
U.S. Cl. 325—24 **10 Claims**



1. A transmitter-receiver circuit comprising:

first and second hybrid circuits each having four terminals;

first and second nonlinear circuits each having high-frequency and low-frequency signal terminals with a non-linear element connected thereto;

a driver circuit operable to produce a bias voltage in response to a modulating signal; and

a radio-frequency generator,

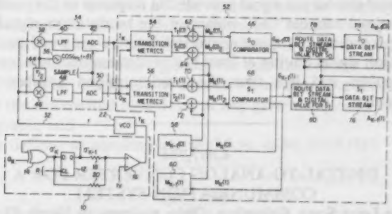
wherein a first one of the four terminals of the first hybrid circuit serves as a common input-output terminal for signal transmission and reception, the second and third terminals of the first hybrid circuit being respectively connected to the high-frequency signal terminals of the first and second nonlinear circuits, the radio-frequency generator being connected to the fourth terminal of the first hybrid circuit, a first one of the four terminals of the second hybrid circuit being connected to the output terminal of the driver circuit, the second and third terminals of the second hybrid circuit being respectively connected to the low-frequency signal terminals of the first and second nonlinear circuits and the fourth terminal of the second hybrid circuit serving as an output terminal for the received signal.

4,087,752

DIGITAL COMMUNICATIONS TREE SEARCHING DETECTION

William J. Melvin, Costa Mesa, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 25, 1977, Ser. No. 790,208
Int. Cl.² H04L *27/10*
U.S. Cl. 325—30 **26 Claims**



1. A method of detecting digital data correlatively encoded into discrete plural states and transmitted by modulating a carrier signal whose phase in each baud interval is a function of the data, comprising:

demodulating the transmitted signal to provide a baseband signal which retains the phase information;

generating a reference signal from the baseband signal;

comparing the baseband signal during each baud interval with the reference signal to determine the probability, designated transition metric, of traversing each possible path into each state from the respective possible prior states in the previous baud interval;

adding the transition metric for each path to the state metric for the prior state from which the path originated to arrive at a path metric, said state metric representing the highest probability of being in the associated prior state;

comparing during each baud interval all of the path metrics for each state to determine the maximum one thereof, designated the survivor metric;

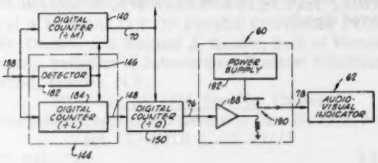
storing the survivor metric for each state in each baud interval for use as the prior state metric in the next succeeding baud interval, and

generating for each state a fixed length data bit stream which is the same as the data bit stream generated during the previous baud interval for the prior state corresponding to its survivor metric with the oldest bit thereof being omitted and the data bit associated with the survivor metric path being inserted as the newest bit.

4,087,753
COMMUNICATION APPARATUS FOR COMMUNICATING BETWEEN A FIRST AND A SECOND OBJECT

John C. Paul, San Jose, Calif., assignor to Information Identification Co., Inc., Ft. Worth, Tex.

Division of Ser. No. 462,247, Apr. 19, 1974, Pat. No. 3,986,167, which is a continuation-in-part of Ser. No. 221,712, Jan. 28, 1972, Pat. No. 3,839,717. This application Mar. 3, 1976, Ser. No. 663,428
Int. Cl.² H04Q 1/32
U.S. Cl. 325—38 R 10 Claims



10. A method for communicating via a plurality of channels utilizing a single frequency modulation signal, comprising:

receiving the modulation signal and providing an output signal pulse in response to a predetermined number "L" pulses of the received modulation signal;

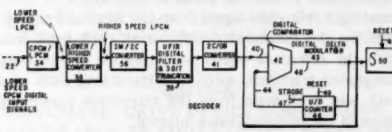
receiving the modulation signal and providing an output signal pulse in response to a predetermined number "M" pulses of the received modulation signal; and

receiving the output signal provided in response to the predetermined number "L" pulses of the modulation signal and the output signal provided in response to the predetermined number "M" pulses of the modulation signal and providing an output signal indicating a received modulation signal having at least the predetermined number "L" pulses and less than the predetermined number "M" pulses.

4,087,754
DIGITAL-TO-ANALOG CONVERTER FOR A COMMUNICATION SYSTEM

Ching-Long Song, Columbus, Ohio, assignor to North Electric Company, Galion, Ohio

Continuation of Ser. No. 482,380, Jun. 24, 1974, abandoned. This application Aug. 24, 1976, Ser. No. 717,458
Int. Cl.² H03K 13/24
U.S. Cl. 325—38 B 3 Claims

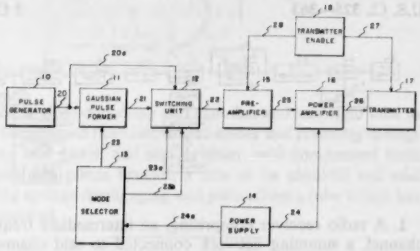


1. A communication system for the conversion of linear pulse code modulation signals to linear delta modulation signals and then to analog signals comprising input means via which linear pulse code modulation signals are received, speed conversion means coupled to said input means including buffer register means operable to increase the frequency of the received signals, converter means for converting the signals output from said speed conversion means to two's complement format, digital filter means including register means coupled to the output of said converter means, first means for adding each word output from said converter means to the preceding word received from said register means, and second means for registering the output of said first means, further means for effectively dividing each word output from said second means by a predetermined number, means coupled to said further means to invert the sign bit to thereby convert the signals to offset binary format, a digital delta modulator including up-down counter means, said digital delta modulator being responsive to said signals in the offset binary format to output linear delta modulation signals, an analog line, integrating means coupled between the output of the digital delta modulator and the analog line to convert the delta modulated signals to analog signals, and reset means for resetting the integrating means to a zero analog level in response to detection of a zero count in the up-down counter means.

4,087,755
SOLID STATE PULSE GENERATOR FOR AN AIR NAVIGATIONAL SYSTEM

Jesse S. LeGrand, Clifton, N.J., assignor to International Telephone & Telegraph Corporation, Nutley, N.J.

Filed Oct. 1, 1975, Ser. No. 618,710
Int. Cl.² H03K 7/00
U.S. Cl. 325—151 10 Claims



1. Apparatus for transmitting signals in an air navigational system comprising:

a signal generator providing pulses of desired character and repetition rate;

a pulse amplifier responsive to said pulses for producing driving pulses;

a radio frequency transmitter responsive to said driving pulses modulating a carrier for sending said signals; and

a power supply providing operating voltages to said signal generator and said pulse amplifier, said power supply having an output characteristic such that said pulses and said driving pulses are modified relative to said repetition rate to prevent overdriving said transmitter and to maintain optimum pulse amplifier efficiency.

4,087,756
FM FEEDBACK DEMODULATOR HAVING THRESHOLD EXTENSION CIRCUIT WITH TWO-POLE CRYSTAL FILTERS

Walter McDowell Rogers, Jr., Indialantic, Fla., assignor to Harris Corporation, Cleveland, Ohio

Filed Jun. 14, 1977, Ser. No. 806,593
Int. Cl.² H03D 3/06; H04B 1/26
U.S. Cl. 329—50 7 Claims

1. In a frequency modulation feedback demodulator having:

a first mixer circuit for receiving an IF input FM signal and a local oscillator signal and converting said IF input FM signal to a first frequency-converted IF FM signal,

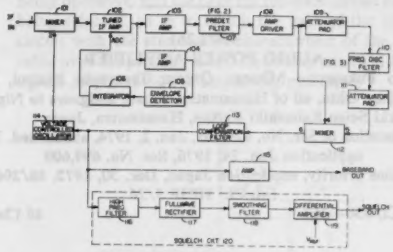
an IF amplifier stage coupled to said first mixer circuit for amplifying and selectively filtering said first frequency-converted IF FM signal within a first prescribed narrow bandwidth,

an FM discriminator stage, coupled to said IF amplifier stage, for selectively filtering the output of said IF amplifier stage within a second prescribed narrow bandwidth wider than said first prescribed narrow bandwidth, and mixing the selectively filtered output of said IF amplifier

stage with the output of said IF amplifier stage to obtain an FM detection discriminator output signal,

a controlled oscillator having an output coupled to said first mixer circuit for supplying said local oscillator signal to said first mixer circuit, and

a feedback connection coupling the output of said FM discriminator stage to said controlled oscillator for causing the frequency of the local oscillator signal to change to



reduce the deviation of the FM signal through said IF amplifier and FM discriminator stages,

the improvement wherein

said IF amplifier stage includes a predetection filter comprising a two-pole bandpass filter having said first prescribed bandwidth,

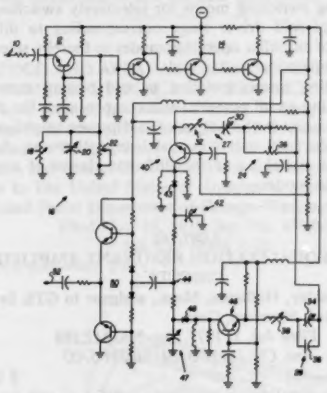
said FM discriminator stage includes a frequency discriminator filter comprising a two-pole bandpass filter having said second prescribed bandwidth.

4,087,757

CONSTANT DELAY RESONANT TANK CIRCUIT COMBINATION FOR FREQUENCY DISCRIMINATION

Vernon R. Cunningham, Melissa, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 30, 1976, Ser. No. 755,719
Int. Cl.[2] H03D 3/26
U.S. Cl. 329—143 **2 Claims**



2. A multitank filter comprising, in combination:

a first tuned circuit means having a first amplitude response, a first Q value Q_1 and a resonance at a first frequency ω_{o1};

a second tuned circuit means having a second amplitude response, a second Q value Q_2 and a resonance at a second frequency ω_{o2};

a primary tank circuit means, including signal input means, having a third amplitude response and a third Q value Q_3, and resonant at a frequency ω_{o3} intermediate ω_{o1} and ω_{02};

means connecting said primary tank circuit means to said first and second tuned circuit means for supplying filtered signals thereto;

output means, connected to at least one of said first and second tuned circuit means, for providing output signals which, relative to signals supplied to said input means, have a substantially linear amplitude response (M) and a constant differential time delay (τ) over a given frequency band; and

the linear amplitude response and constant delay at any frequency on a graph of M or τ respectively is defined by the equations:

$$M = \sqrt{M_1^2 + M_2^2 - 2M_1M_2 \cos(\beta - \alpha)}, \text{ and}$$

$$\tau_a = t - (\gamma/2\pi f_b).$$

where M is the linear amplitude response at a given frequency,

M_1 is the instantaneous magnitude of the demodulated signal output by said first tuned circuit means,

M_2 is the instantaneous magnitude of the demodulated signal output by said second tuned circuit means,

α is a notation of convenience and equals $2\pi f_b(t-\tau_{a1})$,

where f_b is a notation of convenience for determining the frequency at which the differential time delay (τ_a) is measured with respect to the center frequency (ω_c) of a band of frequencies,

t is the instantaneous time and specifies the instantaneous phase of f_b, and

τ_{a1} is the differential time delay referred to the band center delay of the carrier signal as it traverses through the primary tank and the (lower frequency) first tuned circuit means,

β is a further notation of convenience used to simplify the writing of mathematical equations and equals $2\pi f_b(t-\tau_{a2})$ with the identical definitions applying as used in conjunction with α and with τ_{a2} being the time differential delay of the higher frequency or second tuned circuit means,

τ is the differential time delay at any given frequency on the graph, and

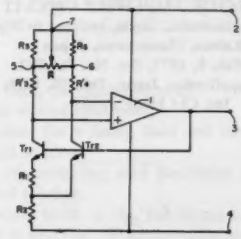
γ is defined as equaling arc $\sin(M_1 \sin \alpha - M_2 \sin \beta/M)$.

4,087,758

REFERENCE VOLTAGE SOURCE CIRCUIT

Kyuichi Hareyama, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1976, Ser. No. 707,015
Claims priority, application Japan, Jul. 25, 1975, 50-91201
Int. Cl.[2] H03F 3/45
U.S. Cl. 330—261 **9 Claims**



1. A reference voltage source circuit comprising: a differential amplifier having input terminals and an output terminal; a pair of transistors having bases connected in common and collectors respectively connected to different input terminals of said differential amplifier; load resistors connected to said transistor collectors; means for supplying said transistors with collector currents through said respective load resistors; means for coupling the output terminal of said differential amplifier to

the common base junction of said transistors; and adjusting means for adjusting said collector currents of said transistors so that the sum of the base-emitter forward junction voltage V_{BE} of one of said pair of transistors and α-times a difference voltage ΔV_{BE} between said voltages V_{BE} of said pair of transistors, α being a positive constant, is equal to a silicon energy bandgap voltage; wherein β-times said silicon energy bandgap voltage, α being a constant at least equal to one, is an output reference voltage of said reference voltage source circuit.

4,087,759

POWER AMPLIFIER DEVICES

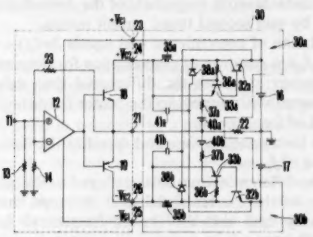
Masayuki Iwamatsu, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Feb. 28, 1977, Ser. No. 772,902

Claims priority, application Japan, Mar. 2, 1976, 51-23986[U]

Int. Cl.² H03F *3/26*

U.S. Cl. 330—262 **7 Claims**



1. A power amplifier including an output transistor, a source of excitation voltage for the power amplifier, a switching type regulating circuit connected between said output transistor and said excitation voltage source for regulating application of said excitation voltage to said output transistor, a load element for said power amplifier having one end connected to the emitter electrode of said output transistor through an output terminal and the other end grounded, and said switching type regulating circuit being responsive to a regulating voltage equal to the sum of a constant voltage required to be impressed across the collector and emitter electrodes of said output transistor and the output voltage of said amplifier derived across the load element whereby the collector-emitter voltage of the output transistor is maintained at a substantially constant value irrespective of the output terminal voltage.

4,087,760

TRANSISTOR AMPLIFIER CIRCUIT

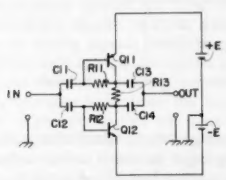
Kenji Yokoyama, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Feb. 8, 1977, Ser. No. 766,592

Claims priority, application Japan, Feb. 10, 1976, 51-12884

Int. Cl.² H03F *3/183*

U.S. Cl. 330—265 **8 Claims**



1. A transistor amplifier circuit comprising:

a pair of complementary transistors having respective collectors, bases and emitters;

a first ohmic resistance means connected between said collectors;

a positive and a negative supply voltage terminal directly connected with said emitters of said pair of complementary transistors respectively; and

a pair of second ohmic resistance means, each being connected between the base of each of said transistors and the interconnection point of said first ohmic resistance means and the collector of each of said transistors, respectively.

4,087,761

AUDIO POWER AMPLIFIER

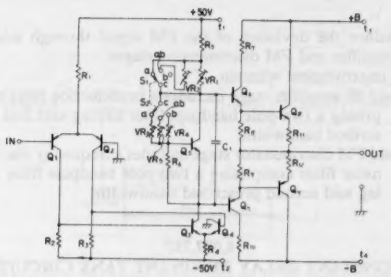
Nobuo Fukumoto; Mitsugo Ohiwa; Teruyoshi Matsui, and Hajime Ohta, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Continuation of Ser. No. 429,703, Jan. 2, 1974, abandoned. This application Jun. 24, 1976, Ser. No. 699,609

Claims priority, application Japan, Dec. 30, 1972, 48/2946

Int. Cl.² H03F *3/26*

U.S. Cl. 330—267 **46 Claims**



1. A power amplifier comprising:

a power amplifier stage,

a driver stage coupled to said power amplifier stage for driving said power amplifier stage,

variable biasing means coupled to said driver stage and including switching means for selectively switching bias values of said driver stage corresponding to different classes of amplifier operation modes to thereby select one of said operation modes, and

compensating means included in said biasing means for developing a null potential and compensating for drift of the null point in the output of said power amplifier from zero volts, said null potential being otherwise changed with the switching of the different classes of amplifier operation modes.

4,087,762

CABLE EQUALIZATION RESONANT AMPLIFIER CIRCUIT

Albert H. Ashley, Holliston, Mass., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jul. 1, 1977, Ser. No. 812,183

Int. Cl.² H03F *3/04;* H03H *5/00*

U.S. Cl. 330—304 **8 Claims**

1. A cable equalization resonant amplifier circuit for compensating for the attenuation effects of a coaxial cable on signals transmitted over the coaxial cable, said cable equalization resonant amplifier circuit comprising:

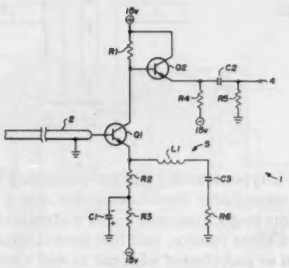
an amplifying transistor for amplifying signals over a predetermined frequency bandwidth, said transistor having a base to which the signals transmitted over a coaxial cable are applied, a collector, and an emitter;

biasing means coupled with the amplifying transistor and operative to cause the amplifying transistor to conduct and to amplify the signals applied to its base and to present the amplified signals at its collector;

resonant circuit means including an inductive element and a capacitive element in the emitter circuit of the amplifying transistor, said inductive and capacitive elements having a predetermined value of Q and a predetermined resonant frequency;

matching circuit means in the emitter circuit of the amplifying transistor;

said resonant circuit means and matching circuit means being operative, and the Q of the resonant circuit elements being selected, so as to match the gain of the amplifier circuit with the attenuation characteristic of the coaxial cable over the predetermined frequency bandwidth of the signals amplified by the amplifying transistor;



peak gain means in circuit with the inductive and capacitive elements of the resonant circuit means and in circuit with the collector of the amplifying transistor and operative to establish the peak value of gain for the amplifier circuit at the resonant frequency of the inductive and capacitive elements; and

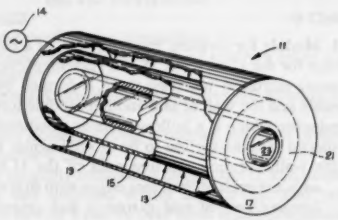
output circuit means coupled to the collector of the amplifying transistor and operative to apply to an output signals amplified by the amplifying transistor at its collector in accordance with the gain characteristic established for the amplifier circuit by the resonant circuit means, the matching circuit means and the peak gain means.

4,087,763

METHOD AND APPARATUS FOR SECONDARY LASER PUMPING BY ELECTRON BEAM EXCITATION

E. Victor George, Livermore; William F. Krupke, Pleasanton; John R. Murray, Livermore; Howard T. Powell, Livermore; James C. Swingle, Livermore; Charles E. Turner, Jr., Livermore, and Charles K. Rhodes, Palo Alto, all of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 10, 1975, Ser. No. 630,843
Int. Cl.[2] H01S 3/00
U.S. Cl. 331—94.5 PE **18 Claims**



1. Apparatus for producing substantially monochromatic radiation by action of an electron beam, the apparatus comprising:

a source of electrons;

a cathode for accelerating the electrons, operatively associated with the source;

an anode adjacent to but spaced from the cathode, the anode being capable of transmitting highly energetic electrons;

a fluorescer gas, present at a partial pressure of at most 50 torr, containing buffering molecules and containing molecules capable of fluorescence in a narrow band with FWHM no more than 250 A near a frequency ν_1, in the ultraviolet region of the electromagnetic spectrum below 2500 A through excitation by energetic electrons incident upon the gas, adjacent to the anode and insulated from contact with the cathode;

first container means, operatively associated with the anode, for containing the fluorescer gas;

a second gas, containing buffering molecules and containing molecules capable of being photolytically dissociated to form an excited species in response to incident ultraviolet radiation from the fluorescer gas, which will emit substantially monochromatic radiation near frequency ν_2; and

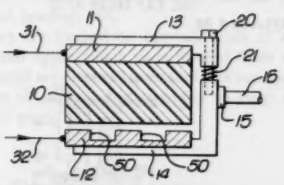
second container means, adjacent to but spaced from the anode, for separating the second gas from the fluorescer gas and the accelerated electrons, which means is substantially transparent to the fluorescence radiation, whereby the second gas emits substantially monochromatic radiation near frequency ν_2 in a chosen direction.

4,087,764

GASEOUS THIN FILM ACOUSTICALLY TUNED LASER

Robert A. Young, Chatsworth, Calif., assignor to Xonics, Inc., Van Nuys, Calif.

Filed Apr. 8, 1976, Ser. No. 675,165
Int. Cl.[2] H01S 3/10
U.S. Cl. 331—94.5 M **20 Claims**



1. In a laser, the combination of:

first and second electrodes;

a container for a lasing fluid and including a laser beam output window;

means for mounting said electrodes in said container in spaced relation;

a dielectric block in the gap between said electrodes and fixed to said first electrode, said dielectric block being an electrostrictive material whereby the distance between said block and second electrode varies with an applied voltage across said electrodes, varying in a direction perpendicular to the lasing direction; and

means for connecting an electric power supply to said electrodes providing voltage pulses across said electrodes,

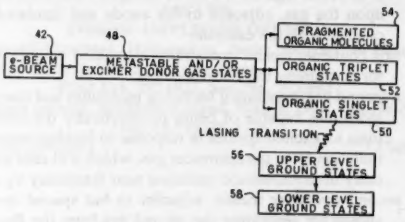
with an applied voltage at said electrodes causing an electric field between said dielectric block and second electrode, with the resulting discharge current exciting molecules of the fluid.

4,087,765

ORGANIC TRANSFER LASER METHOD AND MEANS

Stephen A. Edelstein; Donald C. Lorents, both of Palo Alto; Michael V. McCusker, Los Altos, and Thomas F. Gallagher, Palo Alto, all of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.

Filed Jun. 8, 1976, Ser. No. 693,851
Int. Cl.[2] H01S 3/00
U.S. Cl. 331—94.5 G 22 Claims



1. A laser capable of producing stimulated laser emission comprising,

an optical resonant cavity containing a gas mixture comprising donor gas atoms, consisting of atoms of noble gas or a group IIB transition metal, and organic, aromatic compound, gas molecules at partial pressures of between about 1 to 10 atmospheres and about 1 to 100 torr, respectively,

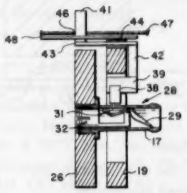
exciting means including electron beam means for supplying excitation to the donor gas atoms to electronically excite the same, which excited donor gas, in turn, excites organic gas molecules by collisional energy transfer, from which excited organic gas molecules stimulated laser emission is produced.

4,087,766

LASER HAVING BEAM TERMINATING MECHANISM

Galen E. Mohler, Los Altos, Calif., assignor to Lexel Corporation, Palo Alto, Calif.

Filed Jul. 9, 1976, Ser. No. 703,858
Int. Cl.[2] H01S 3/02
U.S. Cl. 331—94.5 M 13 Claims



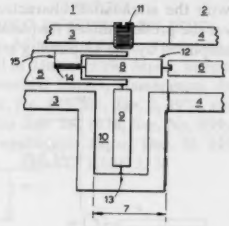
1. In a laser hsaving an optical cavity including a lasable medium contained between a pair of opposed optical reflectors which oscillate optical radiation along an optical axis through said lasable medium, with at least one of said reflectors being partially transparent to said radiation to transmit an output beam from said optical cavity; a protective mechanism for terminating said output beam independent of operation of the power source for said laser comprising a barrier moveable between a first position transverse to said optical axis between said optical reflectors to prevent the oscillation of optical radiation through said lasable medium and a second position free of said optical axis allowing oscillation by said optical reflectors of optical radiation through said lasable medium, and an actuator accessible exteriorly of said laser for moving said barrier between said first and second positions.

4,087,767

L-TYPE MATCHING PAD FOR COAXIAL LINES

Jack Kenneth Perkins, Ipswich, England, assignor to The Post Office, London, England

Filed Aug. 23, 1976, Ser. No. 716,443
Claims priority, application United Kingdom, Sep. 3, 1975, 36358/75
Int. Cl.[2] H01P 5/02
U.S. Cl. 333—33 2 Claims



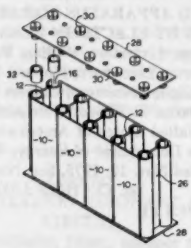
1. An L-type matching pad for connecting first and second coaxial transmission lines having first and a second central conductors respectively and an outer conductor, a series resistor and a shunt resistor, said first central conductor having a cavity in an end thereof adjacent to said second central conductor, said series resistor electrically connecting said first and second central conductors and being at least partially contained within said cavity, said shunt resistor electrically connecting said first central conductor and said outer conductor, said shunt resistor being situated substantially in the central region of the length of said series resistor.

4,087,768

MODULE FOR CAVITY RESONANCE DEVICES

Frederick Arthur S. Furneaux, Toronto, Canada, assignor to Sinclair Radio Laboratories Limited, Concord, Canada

Filed Oct. 18, 1976, Ser. No. 733,108
Int. Cl.[2] H01P 7/00, 7/06
U.S. Cl. 333—83 R 12 Claims



1. Module for forming the side walls of a cavity resonance device for use at between 25 and 1200 megacycles comprising a metal extrusion whereby there is formed by the said one module and the wall of said another module form an electrical conductor which is a hollow metallic conductor:

shaped in cross-section to be of rectangular U-shape,

the walls forming the free ends of the U being provided adjacent each of their free edges with first shaped portions forming part of said extrusion and extending longitudinally therealong,

at least one of the walls forming the U-shaped module being provided adjacent each edge of the outer surface of said wall with second shaped portions forming part of said extrusion and extending longitudinally therealong,

said first shaped portions and said second shaped portions

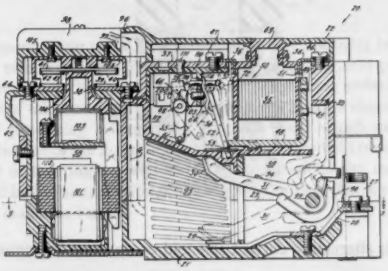
being respectively designed so that the two first shaped portions of one module may respectively be slid longitudinally into to inter-fit with the two second shaped portions of another module to connect said modules mechanically and electrically at each interfitting of a first and a second shaped portion.

4,087,769

TORSION SPRING FOR CONTACT PRESSURE

Bernard Di Marco, and Keith T. Krueger, both of Bellefontaine, Ohio, assignors to I-T-E Imperial Corporation, Spring House, Pa.

Filed Apr. 28, 1976, Ser. No. 681,250
Int. Cl.[2] H01H 77/02
U.S. Cl. 335—16 12 Claims



1. A multipole switching device including for each pole thereof a relatively stationary contact; a movable contact engageable with said stationary contact and a contact arm having said movable contact on one end thereof; a contact operating means operatively connected to said arms for opening and closing said device; a carrier interposed between said movement thereof about a pivot axis by said operating means; said carrier including individual locating formations for each of said arms; first means at each of said locating formations pivotally mounting said arms at their outer ends to said carrier whereby each of said arms is independently and pivotally movable with respect to said carrier about an axis that is substantially coincident with said pivot axis; individual contact biasing means for each of said arms urging said movable contacts toward said stationary contacts; said biasing means being proportioned to permit substantial opening movement of said movable contacts under severe overload conditions solely as a result of electrodynamic forces prior to opening of said switching device by said operating means.

4,087,770

INDUSTRIAL RELAY

Edward H. Kuhn, Milwaukee, and John S. Hart, Racine, both of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Jun. 29, 1976, Ser. No. 700,837
Int. Cl.[2] H01H 67/02
U.S. Cl. 335—132 9 Claims

1. A relay, the combination comprising:

a cartridge housing which encloses and retains a set of electrical contacts;

a magnet assembly attached to said cartridge housing and including:

(a) a magnet housing having a bottom and a set of walls which define a cavity;

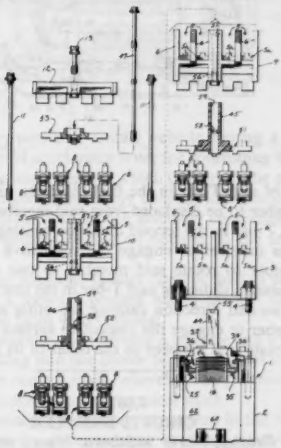
(b) a yoke assembly retained to the bottom of said magnet housing and disposed within said cavity, said yoke assembly having a pair of pole faces which are directed away from said bottom;

(c) a coil module disposed in said cavity and including an operating coil which is magnetically coupled to said yoke assembly;

(d) a drive yoke having a pair of laterally spaced legs which extend into said cavity on opposite sides of said yoke assembly and which are received by and slidably retained in guideways that are formed on the interior surfaces of opposing walls of said magnet housing;

(e) a pair of bias springs, one disposed between the magnet housing and one of said drive yoke legs and the other disposed between said magnet housing and the other of said drive yoke legs; and

(f) an armature assembly fastened to said drive yoke and carried thereby between an unactuated position in which a pair of pole faces on the armature assembly are spaced from the pole faces on the yoke assembly and an actuated position in which the armature assembly pole faces engage the yoke assembly pole faces;



means coupling the drive yoke to a movable contact in said set of contacts;

wherein said yoke assembly is resiliently mounted to the bottom of said magnet housing by a lower shock pad which is formed from an elastomeric material which is disposed between the yoke assembly and the bottom of said magnet housing; and

in which ears are formed on opposite ends of said yoke assembly and upper shock pads formed from an elastomeric material are disposed over said ears and anchored to the bottom of said magnet assembly to strap said yoke assembly in place.

4,087,771

ELECTRICAL SWITCH

George H. Holwager, 502 Sable Palm Dr., Lake Park, Fla. 33403

Filed Oct. 26, 1976, Ser. No. 735,898
Int. Cl.[2] H01H 3/00
U.S. Cl. 335—190 13 Claims

1. An electrical switch which comprises:

a support;

a member rotatably mounted upon said support;

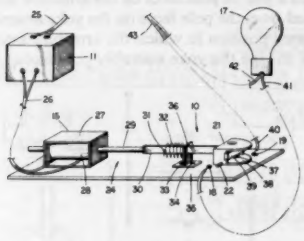
contacts mounted to said support and connectable to an electrical circuit;

contact arms electrically connected together and attached to said member, said member having a first position in which said arms are spaced apart from said contacts and a second position in which said member has been rotated from the first position and in which said arms touch said contacts; and

rotating means for successively rotating said member between the first and second positions, said rotating means including a T-bar slidably mounted to said support, said T-bar having a base and a cross member and being slidable

along its base, the cross member having first and second ends, said member having first and second surfaces positioned to be engaged by the first and second ends, respectively, of the cross member when said T-bar is slid along its base;

said rotating means further including slide means for successively sliding said T-bar along its base in a first direction and then in a directly opposite second direction, the sliding of said T-bar in the first direction causing the cross member to be displaced from said member, the sliding of said T-bar in the second direction causing one end of the cross member to engage the respective surface of said member to rotate said member to one of its positions, successive sliding of said T-bar in the first direction and in the second direction causing the other end of the cross member to engage the respective surface of said member to rotate said member to the other of its positions.

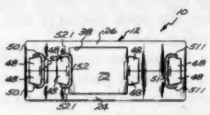


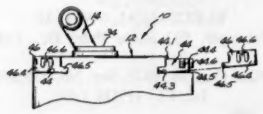
4,087,772

CIRCUIT BREAKER

Aime J. Grenier, North Attleboro, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 30, 1976, Ser. No. 755,780
Int. Cl.[2] H01H *13/06*
U.S. Cl. 335—202 **16 Claims**





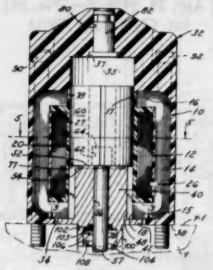
1. A housing for an electrical control device having control means mounted within said housing, said housing comprising a pair of housing sections having locating surfaces thereon, said housing sections being fitted together with the locating surfaces of the respective sections in engagement with each other for defining a housing chamber between the sections, each of said housing sections having exterior surface portions thereon defining a cam surface spaced relative to the locating surfaces of the section, a guide surface, and a detent surface, and clip means fitted over said exterior surface portions of the pair of sections engaging guide surfaces of the respective sections for positioning the clip means on the sections, engaging detent surfaces of the respective sections for retaining the clip means on the exterior section surfaces, and engaging cam surfaces in the respective sections for securing the sections together with a predetermined force.

4,087,773

ENCAPSULATED SOLENOID

Hollis W. Jencks; David C. Jencks, both of Pleasant Ridge, and Ralph M. Burton, Grosse Pointe, all of Mich., assignors to Detroit Coil Company, Ferndale, Mich.

Filed Nov. 15, 1976, Ser. No. 741,979
Int. Cl.[2] H01F *7/10*
U.S. Cl. 335—243 **5 Claims**



1. An alternating current solenoid comprising, in combination:

a quadrilateral frame having a central coil receiving opening with a pair of opposite sides having aligned apertures opening therethrough,

a coil received in the central opening of the frame, a tubular plastic element extending axially through the coil and defining a cylindrical plunger guideway aligned with said apertures,

said frame and coil and tubular plastic element encapsulated in a resin block having an opening at one end thereof aligned with an adjacent one of said apertures in the frame and interiorally hollow at the opposite end to provide a plunger receiving cylindrical chamber aligned with the opening at the opposite side of the frame and forming a continuation of the guideway to receive and support the end of the plunger in the guideway, said chamber having an end wall integrally formed with the block extending transversely across the chamber to limit movement of a plunger entering the chamber,

a non-laminated pole piece received through the open end of the block and extending in a snug fit through said adjacent one of said apertures in the frame and projecting into the plunger guideway,

a non-laminated plunger received in the guideway and supported thereby for reciprocation between the pole piece and the said chamber, and

said pole piece having a radially extending flange portion underlying said frame around the aperture through which the pole piece extends with said flange abutting the frame, said flange being outwardly exposed through the resin block to abut in a compression mode the surface of the device to be actuated whereby when the block is mounted on such device the flange is sandwiched and retained between such device and the adjacent side of the frame.

4,087,774

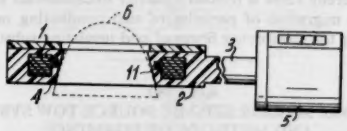
INFORMATION TRANSMITTING SYSTEM

Roger Beuchat, Gland, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland

Filed Jul. 7, 1976, Ser. No. 703,133
Claims priority, application Switzerland, Jul. 9, 1975, 8935/75
Int. Cl.[2] H01F *27/28*
U.S. Cl. 336—73 **2 Claims**

1. Means for transmitting information by magnetic induction

comprising at least two windings, each of toric shape and of different diameters, a first one of said windings being capable of producing an alternating magnetic field and a second one of picking up said field, the first winding adapted to be placed in a position surrounding the second winding and co-planer therewith, each winding disposed in a housing of non-magnetic non-conductive material, the two windings being separable from one another; wherein said means includes a ring of non



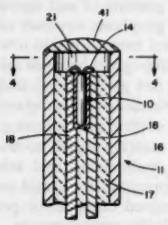
ferro-magnetic metal disposed substantially coaxially between the two windings when the first winding is in said position surrounding the second winding, said ring being embedded in one of said housings, said ring providing a short circuit loop and producing a secondary magnetic field which causes a deflection of the magnetic lines of the primary field toward the axis of the ring to produce a concentration of the magnetic field in the inner portion of the second winding, thereby reducing magnetic losses.

4,087,775

MOUNTING FOR AN RTD ELEMENT

Douglas J. MacKenzie, Park Ridge, and Dennis C. Johnson, Hoffman Estates, both of Ill., assignors to ARi Industries, Inc., Franklin Park, Ill.

Filed Aug. 23, 1976, Ser. No. 716,366
Int. Cl.² H01C 3/04
U.S. Cl. 338—28 **5 Claims**



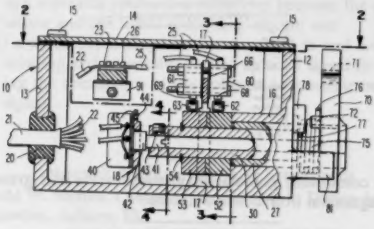
1. A temperature sensing probe including a resistance-temperature device (RTD), said device having a pair of terminal leads to be connected in a circuit for translating variations in resistance of the circuit into usable information, said probe comprising a tubular metal sheath extruded over compacted refractory powder insulation to surround and electrically insulate extruded conductors, a bore in one end of the material, the device being received in the bore and retained therein by means of a refractory substance, the end of the sheath extending outwardly beyond the insulating material to define a chamber within the sheath, the said conductors being joined to said leads within said chamber, a refractory substance filling said chamber, and means for closing said chamber at the outer end thereof.

4,087,776

ACCELERATOR SWITCH ASSEMBLY

Guido A. Donato, Wayne, Pa., assignor to Drexel Industries, Inc., Horsham, Pa.

Filed Dec. 22, 1976, Ser. No. 753,411
Int. Cl.² H01C 10/50
U.S. Cl. 338—198 **8 Claims**



1. In a battery-powered mobile vehicle having a traction motor and a pivotal accelerator lever for controlling the speed of the motor, the improvement which comprises the provision of an accelerator switch assembly adapted to be connected to the accelerator lever, said switch assembly comprising:

a. a box-like housing having an opening in the front wall thereof;

b. an elongated rotatable tubular control shaft in said housing having a forward portion which extends outwardly through said front wall opening;

c. a floating potentiometer having a housing and a rotatable shaft extending into the center bore at the inward end of said tubular control shaft, whereby said potentiometer is floatingly mounted on said control shaft;

d. limit stop means for limiting movement in the rotational direction of the potentiometer housing relative to the switch-assembly housing;

e. set screw means for adjustably fixing the angular position of said potentiometer shaft relative to said control shaft;

f. first and second cams adjustably mounted on the exterior surface of said control shaft between its inward end and the front wall of said housing;

g. first and second cam-follower rollers engaging respectively the cam surfaces of said first and second cams;

h. first and second switches mounted in said switch assembly housing;

i. lever means connecting said first and second switches respectively to said first and second cam-follower rollers; and

j. an accelerator lever mounted on and secured to the outward end of said control shaft and adapted to be moved pivotally for moving said control and potentiometer shafts angularly, thereby to change the setting of said potentiometer and to actuate said first and/or second switches.

4,087,777

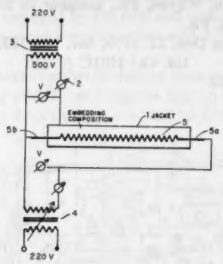
ELECTRICAL HEATING ASSEMBLY HAVING A THERMALLY CONDUCTIVE REFRACTORY ELECTRICAL INSULATING EMBEDDING COMPOSITION BETWEEN AN ELECTRICALLY CONDUCTIVE MEMBER AND A JACKET

Helmut Clasen, Niederkassel-Ranzel, and Klaus Deneke, Troisdorf-Spich, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Division of Ser. No. 533,737, Dec. 17, 1974, Pat. No. 3,959,001.
This application Jan. 2, 1976, Ser. No. 645,986
Claims priority, application Germany, Dec. 21, 1973, 2363790
Int. Cl.² H01C 1/03
U.S. Cl. 338—238 **6 Claims**

1. An electrical heating assembly having an electrically conductive member and a jacket disposed thereabout and

disposed between said member and said jacket a thermally conductive, refractory, electrical insulating embedding composition comprising granular magnesium oxide and granular fused magnesium iron alumino silicate.

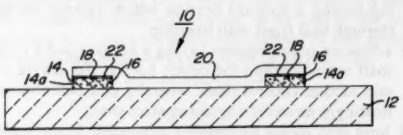


4,087,778

TERMINATION FOR ELECTRICAL RESISTOR AND METHOD OF MAKING THE SAME

Kenneth M. Merz, Gladwyne, and Howard E. Shapiro, Philadelphia, both of Pa., assignors to TRW Inc., Cleveland, Ohio

Filed Apr. 5, 1976, Ser. No. 674,046
Int. Cl.[2] H01C 1/012
U.S. Cl. 338—309 23 Claims



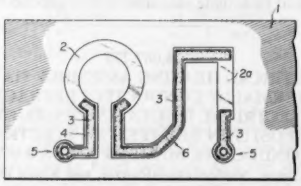
1. An electrical termination material comprising a mixture of a glass frit and a conductive phase, said conductive phase consisting essentially of particles of a metal selected from the group consisting of molybdenum, tungsten, tantalum and titanium.

4,087,779

PRINTED CIRCUIT AND METHOD OF MAKING

Tsumoru Oka, Wakuya, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 428,868, Feb. 27, 1973, abandoned. This application Oct. 21, 1976, Ser. No. 734,469
Claims priority, application Japan, Dec. 28, 1972, 48-2761
Int. Cl.[2] H01C 1/142
U.S. Cl. 338—327 2 Claims



1. A method of producing an electronic printed circuit, comprising the steps of:

(a) forming and coating a flat band of resistance material of a carbon-resin series substance directly on an insulating substrate having fiber reinforcement, the width of said resistance material being less than the width of said insulating substrate, so as to leave a margin of said insulating substrate around said resistance material, the end portions of said resistance band defining terminal portions;

(b) applying electrically conducting material over at least two areas of said resistance band and in direct electrical contact therewith, portions of two areas of said conducting material being inclusive of the terminal portions in said flat band of resistance material, the width of said conducting material being smaller than the width of said resistance material so as to leave a margin of exposed resistance material around said conducting material;

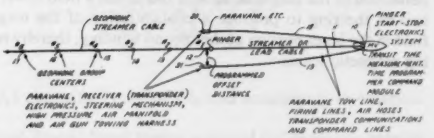
(c) whereby there is formed a barrier to counteract electric field migration of particles of said conducting material along the reinforcing fibers of said insulating substrate.

4,087,780

OFFSHORE MARINE SEISMIC SOURCE TOW SYSTEMS AND METHODS OF FORMING

Oswald A. Itria, Bellaire, and James D. Todd, Houston, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Jun. 28, 1976, Ser. No. 700,245
Int. Cl.[2] G01V 1/28
U.S. Cl. 340—7 R 12 Claims


GEOPHONE STREAMER CABLE
PARAVANE, ETC.
FINGER
STREAMER OR LEAD CABLE
FINGER START-STOP ELECTRONICS SYSTEM
TRANSIT TIME MEASUREMENT TIME PROGRAM PER COMMAND MODULE
GEOPHONE GROUP CENTERS
PROGRAMMED OFFSET DISTANCE
PARAVANE, RECEIVER (TRANSPONDER) ELECTRONICS, STEERING MECHANISM, HIGH PRESSURE AIR MANIFOLD AND AIR GUN TOWING HARNESS
PARAVANE TOW LINE, FIRING LINES, AIR HOSES TRANSPONDER COMMUNICATIONS AND COMMAND LINES

1. A marine seismic source tow system for ensuring accurate seismic velocity measurements comprising,

(a) a tow vessel,

(b) at least one geophone on a submerged geophone streamer cable means for being towed submerged at a substantial depth behind said tow vessel,

(c) steerable paravane means pulled from behind said tow vessel,

(d) seismic energy source means supported by said steerable paravane means and positioned laterally at a predetermined distance from said geophone,

(e) said steerable paravane means having paravane positioning means responsive to corrective steering signals for controlling the position of said steerable paravane means relative to said geophone streamer cable means,

(f) paravane control means for said tow vessel for transmitting and receiving signals between said steerable paravane means and said one geophone on said geophone streamer cable means for measuring the distance therebetween, and

(g) said paravane control means having means for transmitting corrective steering signals to said paravane positioning means for maintaining said seismic energy source means spaced precisely from said one geophone at said exact predetermined distance for producing more accurate seismic velocity measurements.

4,087,781

ELECTROMAGNETIC LITHOSPHERE TELEMETRY SYSTEM

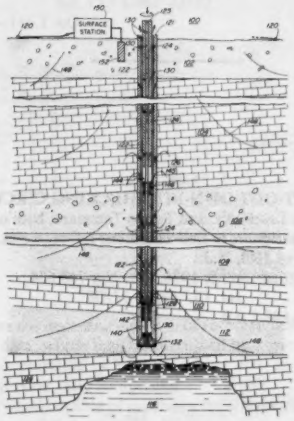
Mario D. Grossi, Cambridge, and Robert K. Cross, Needham, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 484,638, Jul. 1, 1974, abandoned. This application May 3, 1976, Ser. No. 682,417
Int. Cl.[2] G01V 1/40
U.S. Cl. 340—18 NC 16 Claims

12. A method for telemetering measurements from the bottom of an oil well to the surface of the earth comprising the steps of:

measuring physical parameters in an oil well bore hole;

digitizing measurements of said physical parameters
transmitting the digitized measurements upon a carrier signal and with a first solenoidal antenna;
receiving the transmitted signals at one or more positions between said bottom of said oil well and said surface of the earth with a second solenoidal antenna;



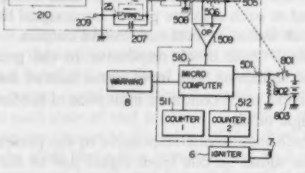
retransmitting the received signals at said positions with said second solenoidal antenna; and
receiving transmitted signals at said surface of the earth;
said transmitted signals and the retransmitted signals comprising electromagnetic radiation fields having a frequency below 30 Hz.

4,087,782

COLLISION DETECTING SYSTEM

Kazuo Oishi, Oobu, and Takashi Yamada, Anjo, both of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation of Ser. No. 525,665, Nov. 20, 1974, abandoned.
This application Aug. 19, 1976, Ser. No. 715,916
Claims priority, application Japan, Dec. 7, 1973, 48/137176
Int. Cl.[2] B60R *21/08*; H01H *35/14*
U.S. Cl. 340—52 H **4 Claims**



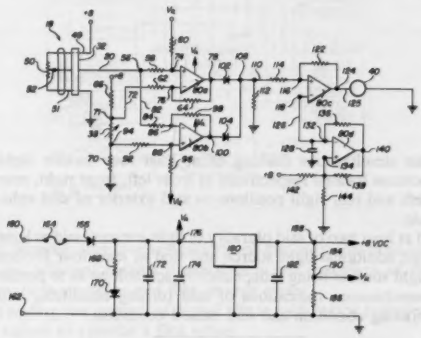
1. A collision detecting system comprising:
(a) a collision sensor secured to a body for generating an AC signal upon occurrence of a collision of the body;
(b) oscillator means connected to the collision sensor and controlled by the AC signal to generate a signal having a frequency higher than that of the AC signal during a portion of each period of said AC signal, said high frequency signal being modulated by the AC signal;
(c) interconnecting means including:
a primary winding connected to said collision sensor and said oscillator means whereby the modulated signal generates an electromagnetic induction field;
a secondary winding operatively related to said primary winding for generating an induced signal in response to the induction field;
first supporting means for supporting said primary winding;
second supporting means for supporting said secondary winding, said second supporting means being detachably joined with said first supporting means whereby when said first and second supporting means are joined, said primary and secondary windings are inductively coupled as a separable contactless connector between the collision sensor and the signal processing circuit; and
(d) a signal processing circuit connected to said secondary winding and responsive to said induced signal for detecting the occurrence of the collision to generate an output signal.

4,087,783

WHEEL INTERFERENCE MONITOR

Ronald W. Steffen, Chatham, Ill., assignor to Dickey-john Corporation, Auburn, Ill.

Filed Oct. 18, 1976, Ser. No. 733,431
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—52 R **11 Claims**



1. A wheel interference monitor apparatus for use with a tractor and a farm implement connected thereto and being pulled thereby, comprising sensor means connected to said tractor and to said implement for detecting an angle of turn of said implement with respect to said tractor and providing a signal proportional thereto, alarm means, circuit means connected to said sensor means including selector means for adjusting a preset turning angle at which the alarm means is to be activated and providing a signal corresponding thereto, means connected to said sensor means and to said selector means for receiving and comparing said sensor signal and said selector signal and providing an output signal in response thereto, and means connected to said receiving and comparing means and to said alarm means for activating said alarm means in response to said output signal whenever said angle of turn meets or exceeds said preset turning angle.

4,087,784

HAZARD SIGNAL, TURN SIGNAL, AND BRAKE SIGNAL SYSTEM FOR AN AUTOMOTIVE VEHICLE

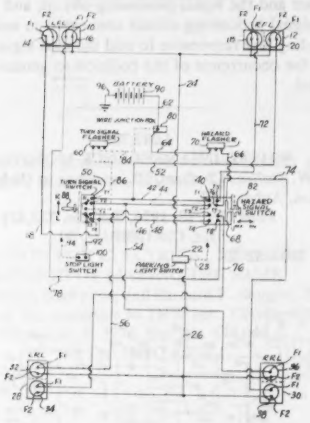
Joe O. West, P.O. Box 37, Reform, Ala. 35481

Filed Apr. 2, 1976, Ser. No. 672,882
Int. Cl.[2] B60Q *1/38*
U.S. Cl. 340—66 **18 Claims**

1. A hazard signal, turn signal, and brake signal system for an automotive vehicle, which comprises:
a source of electrical energy;
a plurality of light sources arranged in a plurality of units, said units being disposed in discrete locations about the exterior of said vehicle; and
means for controlling the energization of each of said plural-

ity of light sources for permitting simultaneous indications of a plurality of vehicle operation conditions;

said vehicle operating conditions including a turning condition indicated by the flashing of at least two of said plurality of light sources located respectively at either the front left and rear left or the front right and rear right of said vehicle, a braking condition indicated by the steady actuation of at least one additional light source located at the rear of said vehicle, and a hazard condition indicated by



the simultaneous flashing of at least four further light sources located respectively at front left, front right, rear left, and rear right positions on said exterior of said vehicle;

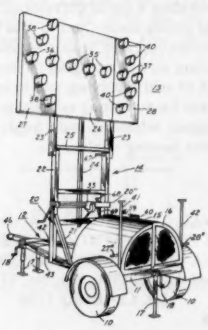
said at least two of said plurality of light sources, said at least one additional light source and said at least four further light sources being independently actuable so as to permit simultaneous indications of said turning condition, said braking condition and said hazard condition.

4,087,785

PORTABLE DISPLAY EQUIPMENT

Nicholas A. Dodich, Evergreen, Colo., assignor to Over-Lowe Company, Inc., Englewood, Colo.

Filed Mar. 7, 1977, Ser. No. 775,166
Int. Cl.[2] B60Q *1/24*; G08G *1/09*
U.S. Cl. 340—114 B **10 Claims**



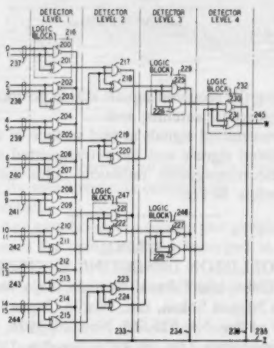
1. A portable display apparatus comprising a supporting structure of the wheeled trailer type, an upright support rigidly secured on said structure, a movable support member mounted on said upright support for up and down movement with respect thereto, a display carrying support pivotally mounted near the top of said movable support member for swinging movement between a horizontal position and a vertical position, means for successively rotating said display carrying support to an upright position in alignment with said upright support and then raising said movable support member to an elevated position above said supporting structure.

4,087,786

ONE-BIT-OUT-OF-N-BIT CHECKING CIRCUIT

Frank William Lescinsky, and Tarmo Tammaru, both of Middletown, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 8, 1976, Ser. No. 748,654
Int. Cl.[2] G06F *11/08*
U.S. Cl. 340—146.1 AB **5 Claims**



1. A one-out-of-*n* check circuit comprising

k successive, serially connected detector levels, a first one of the detector levels having *n* input signal lines and a plurality of logic blocks, each successive higher one of the detector levels having one half the number of input signal lines and logic blocks as does the next lower detector level, the input signal lines being arranged in pairs and a different one of the logic blocks in each detector level connected to each separate pair of input signal lines, each logic block including first and second outputs,

means in each logic block responsive to the presence of excitation signals on both input signal lines of the pair for generating an error condition indication at the first output of the logic block,

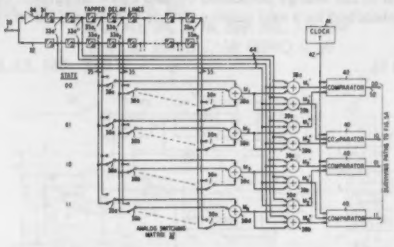
means in each logic block responsive to the presence of an excitation signal on one input signal line of the pair for propagating the excitation signal via the second output of the logic block to an input signal line of the next successively higher detector level, the logic block in the k^{th} detector level providing at its second output a first output of the check circuit and being responsive to the presence of an excitation signal on one and only one of the input signal lines to the k^{th} detector level for generating an excitation signal at its second output and

means for connecting the first output of each logic block to a second output of the check circuit so as to provide to the second output of the check circuit an error signal responsive to the error condition indication at the first output of any logic block.

4,087,787
DECODER FOR IMPLEMENTING AN APPROXIMATION OF THE VITERBI ALGORITHM USING ANALOG PROCESSING TECHNIQUES

Anthony Acampora, Freehold, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 19, 1977, Ser. No. 788,887
Int. Cl.[2] G06F *11/12*
U.S. Cl. 340—146.1 AQ **17 Claims**



1. A decoder for decoding a stream of received convolutionally encoded data, which may be corrupted by noise, having a predetermined plurality of possible states and an arbitrary predetermined code rate, comprising

an input terminal capable of receiving the stream of convolutionally encoded data;

first means connected to said input terminal capable of both (a) effecting the availability of at least a first and a second inverted and noninverted sample of the analog waveform received at said input terminal, each of said samples being separated by a time interval which corresponds to the data rate of the received signal and said first sample corresponds to the most recently received sample, and (b) computing likelihood functions represented by analog voltage signals for all possible transitions into each state of the convolutional code which has a plurality of possible states, said first means selectively using the inverted and noninverted analog waveforms of said first and second samples and the analog voltage signal representative of the most recently computed most probable likelihood function for each of said plurality of possible states for computing said likelihood functions;

second means connected to said first means capable of temporarily storing the most recently computed analog voltage signal generated by said first means representative of the most probable likelihood function for each state for subsequent use by said first means for computing the likelihood functions for each possible transition during the next time interval;

third means connected to the output of said first means for comparing the analog voltage signals representative of the likelihood functions associated with each state and generating an output signal indicating the most probable transition into each state of said plurality of possible states; and

fourth means responsive to the output of said third means for storing the most likely data sequence into each state over a predetermined length and for producing at an output terminal thereof a stream of data corresponding to the decoded data.

4,087,788
DATA COMPRESSION SYSTEM

Brian J. Johannesson, Waterloo, Calif., assignor to NCR Canada Ltd - NCR Canada Ltee, Mississauga, Calif.

Filed Jan. 14, 1977, Ser. No. 759,604
Int. Cl.[2] G06K *9/12*
U.S. Cl. 340—146.3 AE **16 Claims**

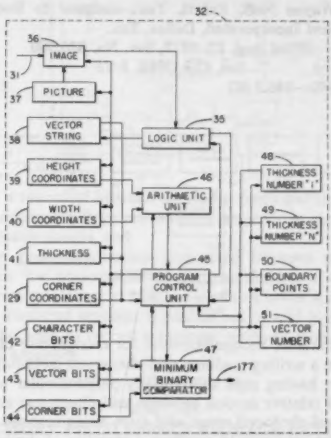
1. In a pattern recognition process including the steps of scanning a pattern and digitizing elemental areas of the pattern into pattern digital bits and background digital bits, a pattern recording method comprising the steps of

(a) sensing the number of pattern digital bits representing the thickness of the pattern;

(b) scanning the pattern digital bits comprising the outer boundary of the pattern;

(c) storing a first portion of the outer boundary of the pattern in a first storage area;

(d) replacing the remaining portion of the outer boundary in the first storage area with the inner boundary of the pattern by transposing the remaining portion of the outer boundary a distance equal to the thickness of the pattern;



(e) forming vector representation of line segments connecting adjacent pattern digital bits in the boundary of the pattern stored in said first storage area;

(f) adding the amount of digital bits in said vector representations to provide a first value;

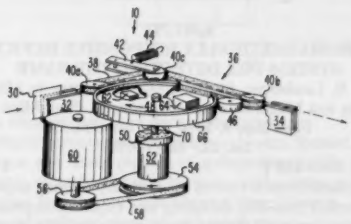
(g) multiplying the amount of digital bits in the height of the character stored in said first storage area by the amount in the width of said pattern to provide a second value;

(h) and recording on a recording medium the minimum value between said first and second values provided in steps (c) and (d).

4,087,789
MAGNETIC INK CHARACTER RECOGNITION SYSTEM

Jack Beery, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 27, 1977, Ser. No. 791,241
Int. Cl.[2] G06K *9/00*
U.S. Cl. 340—146.3 C **13 Claims**



1. An improved magnetic ink character recognition (MICR) system of the class wherein a record medium, bearing encoded characters formed of magnetizable ink, is transported by re-

cord transport means past a write station which magnetically energizes each of the encoded characters in discrete segments, the improvement comprising:

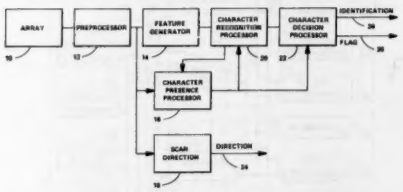
timing means, responsive to the velocity of the record medium through the sensing of the displacement of the record transport means, for correlating the magnetization of each discrete segment with the velocity at which the record medium is being transported to compensate for any non-uniformities in transport velocity.

4,087,790

CHARACTER PRESENCE PROCESSOR

Marion Wayne Neff, Euless, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Aug. 22, 1977, Ser. No. 826,580
Int. Cl.[2] G06K *9/18*
U.S. Cl. 340—146.3 SG **11 Claims**



1. A character recognition unit for recognizing characters located on a writing medium, said characters including certain characters having gaps substantially perpendicular to the direction of relative motion between said characters and a two dimensional photocell array, said array being scanned by rows in a known sequence to produce a plurality of digital signals corresponding to character segments representing said characters on said writing medium comprising:

a. a feature code generator receiving said digital signals and producing a feature code at the row scan rate representing certain predetermined relationships between character segments in each row;

b. a recognition means receiving said feature code at the row scan rate to produce a pattern recognition signal for each scan of said array; and

c. a character presence processor in communication with said recognition means and receiving said digital signals for locating a gap extending between said character segments through each scan of said array, said processor generating a path signal to recognition means when said gap is detected, said gaps extending substantially perpendicular to the direction of relative motion between the characters and said array, said presence processor including means responding to certain pattern recognition signals of said recognition means for blocking said path signal when a pattern of recognition signal indicates one of said certain characters.

4,087,791

ELECTROMAGNETICALLY RESPONSIVE DEVICE AND SYSTEM FOR DETECTING THE SAME

Richard R. Lemberger, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

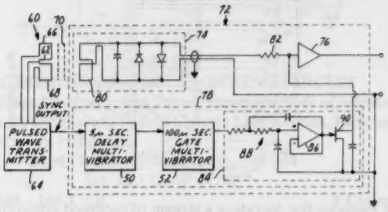
Filed Sep. 9, 1974, Ser. No. 504,059
Int. Cl.[2] G01S *9/02*
U.S. Cl. 340—152 T **4 Claims**

1. An identification system for remotely tagging objects and for thereafter remotely detecting said objects comprising

a passive resonant device capable of providing an electromagnetic response to an external electromagnetic field, said device including an inductor-capacitor tuned circuit resonant at a predetermined frequency,

means for securing said device to an object to be tagged,

means for producing a wide energy spectrum electromagnetic field within an interrogation zone through which said tagged object may pass, comprising a "figure 8" transmitting coil for providing a substantially two dimensional electromagnetic field, a field in one direction being associated with current flowing in two center legs of said "figure 8" coil and a field in another direction being associated with current flowing in two halves of the "figure 8", said field having a duration approximately equal to $\frac{1}{f}$ where f is said predetermined frequency such that a portion of the energy presented by said electromagnetic field is absorbed by a said passive device within said interrogation zone, whereby said field produces in said tuned circuit a damped oscillation at said predetermined frequency, and



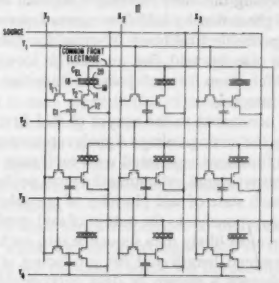
means including a "figure 8" receiving coil having dimensions which are approximately the same as that of the transmitting coil, positioned parallel thereto and spaced therefrom, to define a said interrogation zone therebetween for sensing said damped oscillations extending for a duration equal to at least 20 cycles thereof whereby the presence of the said tagged object in the zone is capable of being detected throughout the zone.

4,087,792

ELECTRO-OPTIC DISPLAY SYSTEM

Juris A. Asars, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 3, 1977, Ser. No. 773,874
Int. Cl.[2] G08B *5/36*; H05B *33/08*
U.S. Cl. 340—166 EL **3 Claims**



1. In an electro-optic display panel in which rows and columns of individual display elements are defined between and interconnected by row and column signal buses with individual transistor control circuitry associated with each individual display element, wherein the transistor control circuitry comprises an information signal switching transistor, an information signal storage capacitor, and a display element drive signal control transistor, wherein a common bus bar connects together the sources of all the display element drive signal transistors of the individual control circuits, which common bus bar is connectable to variable potential means such that the

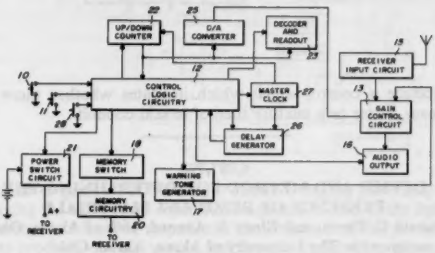
brightness of an individual display element is a function of the time which the stored information signal exceeds the variable potential applied to the source of the drive signal control transistor.

4,087,793

DIGITAL ELECTRONIC CONTROL AND SWITCHING ARRANGEMENT

Alfred Raymond Lucas, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 28, 1976, Ser. No. 736,658
Int. Cl.[2] H04B *1/16*; H04Q *9/00*
U.S. Cl. 340—168 R **32 Claims**



1. A digital electronic control arrangement including in combination:

first switching means;

second switching means;

first counter means coupled to the switching means for counting up and down in response to activation of the first and second switching means respectively;

logic circuitry including first and second circuit means and coupled to the first counter means for providing a control signal in response to the output of the first counter means;

delay generator means including second counter means coupled to the logic circuitry and to the first and second switching means for being activated in response to activation of one of the first and second switching means while the first counter means is in a predetermined state; and

indicator means coupled to the logic circuitry and enabled in response to activation of the second counter means;

said first circuit means of said logic circuitry being coupled to the first switching means and to an output of the second counter means whereby a first auxiliary signal is provided in response to simultaneous occurrence of activation of the first switching means and a predetermined state of the second counter means, said second circuit means of said logic circuitry being coupled to the second switching means and to the output of the second counter means whereby a second auxiliary signal is provided in response to simultaneous occurrence of activation of the second switching means and the predetermined state of the second counter means.

4,087,794

MULTI-LEVEL STORAGE HIERARCHY EMULATION MONITOR

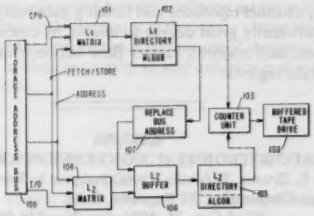
William F. Beausoleil, Hopewell Junction; Peter P. Hennet, Wappingers Falls; Klim Maling, Wappingers Falls, and Norman K. Powers, Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 2, 1973, Ser. No. 320,393
Int. Cl. G06f *13/00*
U.S. Cl. 364—900 **9 Claims**

1. For use with an address sequence produced from a computing system having a single level storage, a system for obtaining data for use in computing average access times for completing storage reference operations in a multi-level storage hierarchy, comprising

emulation means for emulating each hierarchical level in said multi-level storage other than the main storage level by receiving said address sequence and recording the segments of storage located at each of said emulated levels,

counting means connected to said emulation means to provide a record of hits and misses for fetch and store memory references from said address sequence at each of said emulation means, and



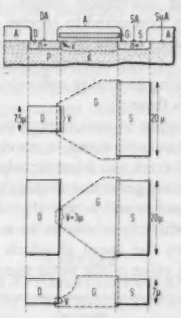
address generation means connected between emulation means for adjacent levels for transferring a displaced segment of storage at a higher level to a lower level where said displaced segment is pushed out of said higher level by the need to record a segment received from said address sequence.

4,087,795

MEMORY FIELD EFFECT STORAGE DEVICE

Bernward Rossler, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 614,682, Sep. 18, 1975. This application Dec. 15, 1976, Ser. No. 750,860
Claims priority, application Germany, Sep. 20, 1974, 2445078; Sep. 20, 1974, 2445079; Sep. 20, 1974, 2445091; Sep. 20, 1974, 2445137; Feb. 12, 1975, 2505816; Feb. 12, 1975, 2505821
Int. Cl.[2] G11C *11/40*; H01L *29/78*; H03K *5/00*
U.S. Cl. 365—185 **78 Claims**



1. An electronic storage device comprising:

a p-doped semiconductor substrate having formed therein source and drain regions of n-doped materials, another region of said substrate between said source and drain regions forming a carrier channel therebetween,

an insulation layer adjacent said substrate,

a floating gate member arranged so as to have at least a portion of said insulation layer disposed between said channel and said floating gate and located so as to be able to receive electrons from said channel through said portion of said insulation layer,

first means for applying a potential to said source and drain regions to produce a longitudinal field strength and a current of electrons between said source and drain regions,

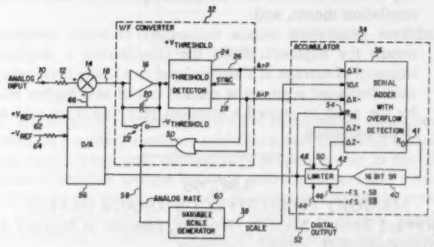
said longitudinal field strength in said carrier channel between said source and drain regions being sufficiently great to accelerate said electrons to a sufficiently great degree that at least a portion of them penetrate said portion of said insulation layer and charge said floating gate by channel injection, said floating gate being charged to a sufficiently great degree to inhibit, by electrostatic induction, said majority carrier flow between said source and drain regions.

4,087,796

ANALOG-TO-DIGITAL CONVERSION APPARATUS

James L. Brown, Toddville, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 21, 1976, Ser. No. 734,492
Int. Cl.² F03K *13/00*; G01R *17/06*
U.S. Cl. 340—187 **3 Claims**



1. Analog-to-digital conversion means comprising, in combination:

analog-to-digital integrating means, including analog input and serial binary digital word output means, for providing digital output words indicative of an integrated analog input signal;

digital-to-analog conversion means, including input and output means, connected to receive digital output words from said output means of said integrating means at said input means of said conversion means, said conversion means providing an analog equivalent error signal at said output means thereof;

means for supplying an analog input signal to be converted;

combining means, connected to receive and algebraically combine said error and input signals,

and a variable scale generator responsive to the amplitude of the input signal to add to said digital output words numbers of scale directly related to the amplitude of said input signal to vary the speed at which the error signal approaches the value of the input signal.

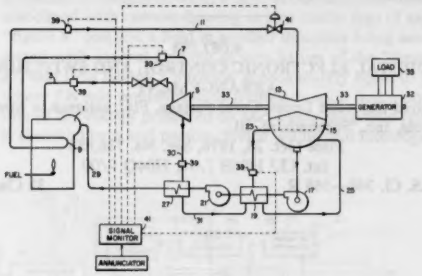
4,087,797

SYSTEM FOR DETECTING WATER IN STEAM PIPES

John S. Wyler, West Goshen, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 19, 1976, Ser. No. 706,333
Int. Cl.² G08B *21/00*
U.S. Cl. 340—229 **6 Claims**

1. A system for detecting whether fluid in a conduit is steam, water or a mixture thereof, said system comprising a conduit, an opening in said conduit, a pressure transducer in fluid communication with said conduit through said opening, said pressure transducer producing a signal which varies as a result of steam, water or a mixture thereof in said conduit, and a signal monitor responsive to a predetermined change in said signal to



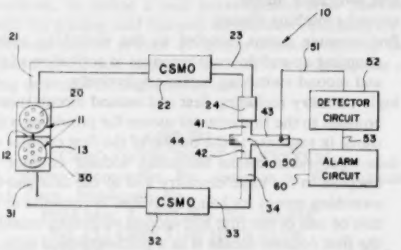
produce a control signal which indicates whether there is steam, water or a mixture thereof in said conduit.

4,087,798

DEVICE AND METHOD FOR DETERMINING THE PRESENCE OF RESONANT MATERIALS

Donald C. Thorn, and Glenn A. Atwood, both of Akron, Ohio, assignors to The University of Akron, Akron, Ohio

Filed Mar. 17, 1976, Ser. No. 667,821
Int. Cl.² G08B *17/10*; G01R *27/04*; H01P *7/06*
U.S. Cl. 340—237 R **18 Claims**



9. A device for determining the presence and unique identity of materials exhibiting resonant characteristics in the presence of electromagnetic oscillations comprising:

means to generate electromagnetic oscillations;

a plurality of resonant cavity means through which the resonant material may pass and within which the resonant material may resonate, said resonant cavity means connected to said means to generate electromagnetic oscillations, and including at least a first said resonant cavity tuned to a transition frequency of the resonant material and at least a second said resonant cavity tuned to a non-transition frequency closely associated to said transition frequency; and

detection means receiving said electromagnetic oscillations and detecting the values of a correlating parameter between at least said first resonant cavity and at least said second resonant cavity.

4,087,799

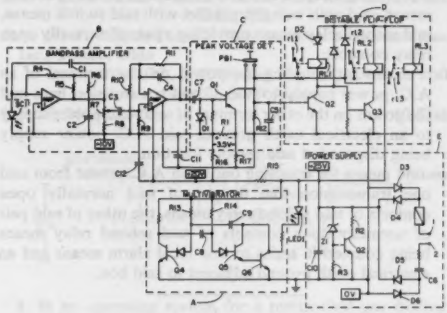
PARTICULATE PRODUCTS OF COMBUSTION DETECTOR EMPLOYING SOLID STATE ELEMENTS

Frans Brouwer, Glencoe, Ill., assignor to Conrac Corporation, New York, N.Y.

Filed Jul. 8, 1976, Ser. No. 703,531
Int. Cl.² G08B *17/10*
U.S. Cl. 340—237.5 **8 Claims**

1. In a particulate products of combustion detector having a

light emitting solid state element and a photocell light coupled one to the other to serve as a particulate sensor, the improvement comprising means periodically pulsing the light element to corresponding pulses of light emission at a first pulse-repetition frequency, a ringing amplifier having an input circuit and an output circuit with the photocell connected to the input

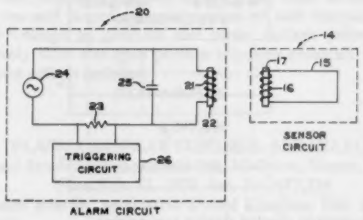


circuit to generate at the output circuit a ringing pulse output having the same pulse-repetition frequency as that of the light element emissions in response to the detection of the particulate products of combustion, and means connected to the output of the ringing amplifier to generate a signal indicative of the detection of the products of combustion.

4,087,800
CONVEYOR BELT MONITORING SYSTEM

Maw-Huei Lee, Brecksville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Oct. 29, 1976, Ser. No. 736,792
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—259 **4 Claims**

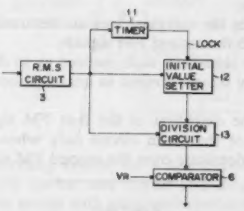


1. A monitoring system for detecting the presence of longitudinal rips in a conveyor belt, said monitoring system comprising an endless flexible conveyor belt, a series of sensor circuits embedded in said conveyor belt and spaced relative to each other at intervals along the length of said conveyor belt, each said sensor circuit consisting of an open loop of conductive wire that has terminal ends and that extends transversely across substantially the width of said conveyor belt and an inductor coil means that has terminal ends and that is wound on a powder core, the terminal ends of said inductor coil means in each said sensor circuit being in electrial connection with the terminal ends of said loop of conductive wire of the sensor circuit, at least one alarm circuit positioned adjacent to the path of advance of said conveyor belt, said alarm circuit including in electrical connection an inductor coil means wound on a powder core, capacitance means, resistor means, oscillator means for generating an alternating signal of constant frequency and a triggering circuit responsive to a change in the voltage across said inductor coil means of the alarm circuit, said inductor coil means of said alarm circuit being positioned in close proximity to said conveyor belt at a location so that the inductor coil means of each said sensor circuit will pass in close proximity to the inductor coil means of said alarm circuit as the said conveyor belt is advanced, said inductor coil means of said alarm circuit and the said capacitance means in electrical connection therewith being in a "primary circuit" that is in electrical resonance at the frequency of the signal generated by said oscillator means in said alarm circuit, said inductor coil means of each said sensor circuit containing a number of turns of wire in the coil to cause the said inductor coil means to be in electrical resonance with its distributed capacitance at the frequency of the said signal generated by said oscillator means within the said alarm circuit with the circuit of the sensor circuit open and during the time the said inductor coil means of the open sensor circuit passes in close proximity to said inductor coil means of said alarm circuit.

4,087,801
APPARATUS FOR DETECTING DAMAGES OF CUTTING TOOLS

Akihiko Noh, Tokyo, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 16, 1975, Ser. No. 641,340
Claims priority, application Japan, Dec. 20, 1974, 49-146452; Apr. 10, 1975, 50-43560; Oct. 24, 1975, 50-128128; Dec. 20, 1974, 49-154893[U]
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—267 R **4 Claims**



1. Apparatus for detecting damage of a cutting tool comprising a detector for producing a detection output signal in accordance with vibration created by at least one of a cutting tool or a workpiece worked thereby during a cutting operation, a signal processing circuit including a root mean square circuit for producing a root mean square signal representing the root mean square value of said detection output signal from said detector, a normal data memory circuit for producing an output data signal at the time of normal cutting, said normal data memory circuit comprising a timer which produces an output signal a predetermined interval after the appearance of said root mean square signal and an initial value setter which produces said output data signal having a value corresponding to the level of said root mean square signal existing at the time when said timer output signal is produced, and comparator means for comparing said output data signal from said normal darta memory circuit with said root mean square signal.

4,087,802
METHOD AND APPARATUS FOR ELECTRONIC SURVEILLANCE OF PRECISELY DEFINED CONTROL ZONE

Robert D. Williamson, 7350 NW. First Ct., Pembroke Pines, Fla. 33024

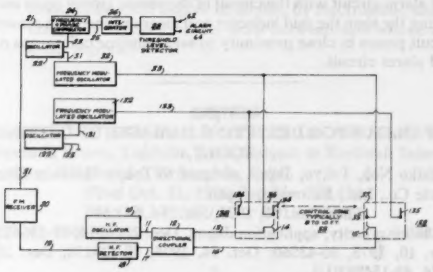
Filed May 24, 1976, Ser. No. 689,336
Int. Cl.[2] G08B *13/22*
U.S. Cl. 340—280 **14 Claims**

1. A method for detecting within a control zone and a marginal area the presence of a transponder having signal mixing capability and energizing an alarm circuit comprising the steps of:

generating HF signals;

propagating through the control zone an electronic wave corresponding to the HF signals;

generating first center reference frequency signals;
frequency modulating the first center reference frequency signals using a first modulation oscillator,
establishing through the control zone an electronic field corresponding to the first frequency modulated (FM) signals;
generating second center reference frequency signals;
frequency modulating the second center reference frequency signals using a second modulation oscillator to



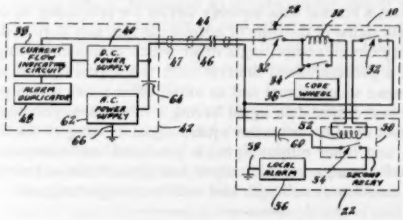
create signals having different characteristics than the first FM signals;
estabilishing in the marginal area an electronic field corresponding to the second FM signals;
detecting the signals in such manner as to detect the FM signals only when received in combination with HF signals; and
translating the detection of the first FM signals into the activation of the alarm circuit only when the first FM signals predominate over the second FM signals.

4,087,803

FIRE BOX ALARM

Vincent Dransfield, 1 Woodside Ave., Little Falls, N.J. 07424

Continuation-in-part of Ser. No. 652,767, Jan. 27, 1976. This application Apr. 7, 1977, Ser. No. 785,451
Int. Cl.[2] G08B *25/00*
U.S. Cl. 340—297 **9 Claims**



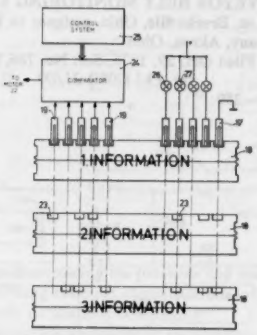
1. A local alarm apparatus adapted to be used in conjunction with a conventional fire alarm circuit which includes at least one local alarm box normally closed switch means disposed at said local alarm box, said switch means being coupled in parallel to the coil of first relay means having a pair of normally closed contacts, said normally closed contacts being in series with said coil, current flow indicating means and a D.C. power supply located remotely in relation to said local alarm box, said current indicating means and said D.C. power supply being coupled in series by a pair of transmission lines to said first relay means contact and said coil to form a closed circuit, the opening of said switch means energizing said relay means to open the contacts thereof thereby opening said closed circuit, said current flow indicating means sensing the cessation of current flow through said closed circuit and activating a suitable remote alarm indicator disposed at the same remote location as said current flow indicating means and said D.C. power supply, said local alarm apparatus comprising:
a box adapted to be mounted on said local alarm box;
local alarm means disposed within said box;
second relay means disposed within said box and providing a coil being coupled in series to said coil of said first relay means, said coils being in parallel with said switch means, said second relay means providing a pair of normally open relay contacts;
first means for coupling the power on one terminal of an A.C. power supply to one of said transmission lines and the power on the other terminal of said A.C. power supply to an electrical earth ground, said A.C. power supply being disposed at said remote location;
second means for coupling only said A.C. power from said one transmission line to one of said normally open contacts of said second relay means, the other of said pair of normally open contacts of said second relay means being coupled in series to said local alarm means and an electrical earth ground adjacent to said box.

4,087,804

INFORMATION DISPLAY DEVICE

Erich Zabler, Karlsruhe; Frieder Heintz, Stutensee, and Viktor Kopernik, Ettlingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 21, 1976, Ser. No. 734,540
Claims priority, application Germany, Nov. 22, 1975, 2552522
Int. Cl.[2] G08B *5/00*; B60Q *1/00*
U.S. Cl. 340—319 **10 Claims**



1. Information display device comprising
a rotatable drum (**10**);
a motor (**22**) connected to rotate the drum;
a plurality of drop flaps (**18**) journalled at the circumference of the drum and carrying information indicia;
and a plurality of holding springs (**19**) having electrically conductive portions engaging the edges of the drop flaps as they become placed under the respective springs upon rotation of the drum, to retain the drop flaps vertically until continued rotation of the drum releases the topmost flap to drop and display information carried thereon
the drop flaps (**18**) carrying coded electrical contacts (**23**) located at the edges of the flaps in predetermined positions, in accordance with a code assigned to individual flaps, the springs (**19**) being located to scan possible positions of contacts to engage the contacts on the flaps and provide flap code signals representative of the particular drop flap engaged by the springs;
and a comparator (**24**) having command signals applied thereto and being further connected to said springs (**19**) to have the flap code signals applied thereto representative of the flap code sensed, and providing a control output signal connected to and controlling rotation or non-rotation of the motor (**22**), selectively, based on the compari-

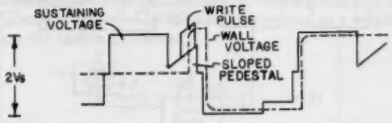
son between the code of the command signal and the code of the contacts of the flap then presently engaged by the springs.

4,087,805

SLOW RISE TIME WRITE PULSE FOR GAS DISCHARGE DEVICE

John W. V. Miller, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 3, 1976, Ser. No. 654,825
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 M 10 Claims



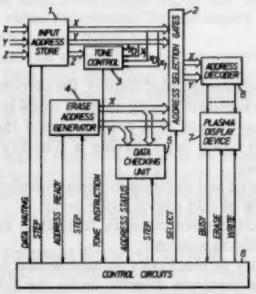
1. In an operating system for a multicelled gas discharge display/memory device, said device including a pair of opposed electrode arrays with proximate electrode portions of at least one electrode in each array defining the cells; an ionizable gas volume between the spaced electrode portions of each cell; a dielectric charge storage member in contact with th gas insulating at least one electrode portion of each cell from the gas; a sustainer voltage source connected across each cell to cyclically impose an alternating voltage having a period; and pulser means for generating write and erase voltage pulses to manipulate the discharge state of individual cells between an "on state" and an "off state", the improvement comprising: said dielectric charge storage member formed from a low operating voltage material, said pulser means including means for generating said write voltage pulses with relatively fast rise time leading edges, said sustainer voltage source generating a sloped pedestal portion of said alternating sustainer voltage and control means for enabling said pulser means to superimpose said relatively fast rise time leading edge write voltage pulse on said sloped pedestal portion of said alternating sustainer voltage to generate said write voltage pulse with a relatively slow rise time portion whereby crosstalk bewteen adjacent cells is reduced.

4,087,806

PLASMA DISPLAY CONTROL APPARATUS

Michael James Miller, Ashfield Rd., Midhurst, Sussex, England

Filed Feb. 11, 1976, Ser. No. 657,224
Claims priority, application United Kingdom, Feb. 17, 1975, 6699/75
Int. Cl.[2] G06K *15/18*
U.S. Cl. 340—324 M 10 Claims



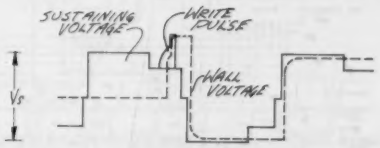
1. Apparatus for controlling a multicell plasma display device which includes an input for receiving a sequence of addresses, each address including two signals with each of the two signals having an ordered plurality of bits and identifying a respective one of two orthogonal coordinates of a cell, and which further includes a persistence control circuit for extinguishing the respective illuminated cell identified by each received address, the apparatus comprising: means for supplying a sequence of addresses such that the persistence control circuit extinguishes illuminated cells in a controlled but apparently random manner; said means including a multi-digit counter for sequencing through a series of counts, each count being defined by an ordered plurality of digits; and said means further including means responsive to the counts for determining the addresses of the cells to be extinguished such that, for each of the two signals of each address, the most significant digits of the count determine the least significant bits of the signal identifying a respective one of the coordinates.

4,087,807

WRITE PULSE WAVE FORM FOR OPERATING GAS DISCHARGE DEVICE

Joseph L. Miavecz, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 12, 1976, Ser. No. 657,494
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 M 15 Claims



1. In an operating system for a multicelled gas discharge display/memory device said device including a pair of opposed electrode arrays with proximate electrode portions of at least one electrode in each array defining the cells; an ionizable gas volume between the spaced electrode portions of each cell; a dielectric charge storage member in contact with th gas insulating at least one electrode portion of each cell from the gas; a sustainer voltage source connected across each cell to cyclically impose an alternating voltage having a period; and pulser means for generating write and erase voltage pulses to manipulate the discharge state of individual cells between an "on state" and an "off state"; and keyer pulser means for generating a steeply rising leading edge on the write and erase voltage pulses, the improvement comprising: said dielectric charge storage member formed from a low operating voltage material and means for turning off said keyer pulser means during the generation of a first portion of said write voltage pulses to form a relatively slow rise time leading edge on said write voltage pulses and turning on said keyer pulser means during the generation of a second portion of said write voltage pulses to form a relatively fast rise time leading edge on said write voltage pulses whereby crosstalk between adjacent cells is reduced.

4,087,808

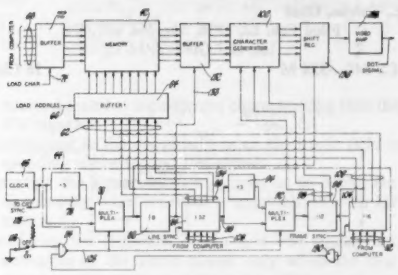
DISPLAY MONITOR FOR COMPUTER NUMERICAL CONTROL SYSTEMS

Lee R. Herndon, Jr., Birmingham, Mich., assignor to Vega Servo Control, Inc., Troy, Mich.

Filed Oct. 15, 1975, Ser. No. 622,552
Int. Cl.[2] G06K *15/20*
U.S. Cl. 340—324 AD 2 Claims

1. A display for alphanumeric characters comprising a cathode ray tube having a screen with luminescent dots in a rectangular array whereby a character display is produced by brightening selected dots in plural character columns and rows, a dot clock for generating a train of dot clock pulses at a predetermined frequency, means connected with the clock means and with the cathode ray tube for causing the cathode ray to scan

the screen in a predetermined raster in timed relation with said clock pulses, dot signal means for producing a dot signal which has a pulse or a space corresponding to each clock pulse, intensity control means connected with the cathode ray tube and the dot signal means for brightening the trace of the ray on the screen in response to a pulse and for darkening it in response to a space, a memory for storing character codes representing a plurality of characters which are to be displayed at predetermined locations on said screen, a character generator for sequentially producing plural binary signals each representing a row of dots of a character to be displayed, a shift register connected between the character generator and the dot signal means, a buffer connected between said memory and said character generator, an address generator including a first frequency divider having its input connected with the dot clock for counting character columns, a line position address counter having a counter output and a divider output, a character line counter having a counter output and a divider output, and a frame position address counter having a counter output, all of said dividers and counters being connected in



cascade in the order named with respect to their inputs and divider outputs, the counter output of the line position address counter and the counter output of the frame position address counter being connected with said memory for advancing the output of the memory from one character code to the next, the counter output of said character line counter being connected with said character generator for advancing the output thereof from one dot line to the next, the output of said first divider being connected with said buffer for transferring one character at a time from the memory to said character generator, the input of said first divider being connected with said shift register for serially applying the output of the character generator to the input of said dot signal means, whereby a character of a certain normal size is produced on said screen, a second frequency divider selectably connectable between said dot clock and the input of said first divider and a third frequency divider selectably connectable between the divider output of said line position address counter and the input of said character line counter, switching means for simultaneously actuating said second and third dividers whereby a character of magnified size is produced on said screen.

4,087,809

MAGNETO-OPTIC BUBBLE DOMAIN HISTOGRAPH

David Leslie Fleming, Edina, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jul. 12, 1976, Ser. No. 704,154
Int. Cl.[2] G01D *7/00*
U.S. Cl. 340—324 R **2 Claims**

1. A bubble histograph, comprising: waveform sampling means receiving an analog signal for sampling the analog signal waveform amplitude at a sampling frequency F and coupling, at said sampling signal F, an energizing signal to only a selected one of M output lines each of which M output lines is representative of a sampled signal wveform amplitude at an associated sample time;

a bubble memory plane comprising:

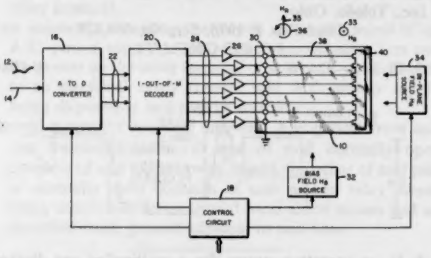
M horizontally aligned bubble propagation paths;

M bubble generators, each one coupling a bubble to only an associated separate one of said propagation paths;

means for coupling each of said M bubble generators to only an associated separate one of said M output lines;

means for serially intercoupling said M bubble generators;

control means controlling said serially intercoupled M bub-



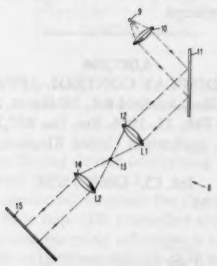
ble generators for generating verticaly aligned, horizontally moving columns of bubbles at said frequency F, the heights of each of said moving columns of bubbles determined by the respectively associated energized one of said M decoder output lines, each discrete bubble of each column moving along its associated propagation path at said frequency F to form a real-time display of said analog signal.

4,087,810

MEMBRANE DEFORMOGRAPHIC DISPLAY, AND METHOD OF MAKING

Roland Yen-Mou Hung, and James Lewis Levine, both of Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1976, Ser. No. 701,436
Int. Cl.[2] G06K *15/18*
U.S. Cl. 340—324 M **2 Claims**



1. In a deformographic display, the combination comprising:

a silicon substrate having a silicon oxide layer formed on one surface thereof to a predetermined thickness, with said silicon oxide layer having a plurality of holes formed therein;

a reflective and deformable metal membrane formed on the surface of said silicon oxide layer;

integrated control circuitry formed in said one surface of said silicon substrate;

a plurality of electrodes formed in said one surface of said silicon substrate directly under the holes in said silicon oxide layer, there being one such electrode per hole, with each electrode being connected to said control circuitry by leads formed on said one surface of said silicon substrate, with the portion of said membrane over a given hole being deformed to a predetermined depth into said

given hole in response to the electrode thereunder being selectively energized by said integrated control circuitry;
first, second and third lenses;
a stop;
a screen; and
a light source for projecting light to said first lens, with said first lens being a collimating lens for directing collimated light to the surface of said reflective and deformable metal membrane, with said membrane reflecting said light to said second lens, with said second lens focusing said light onto said stop, with the light bypassing said stop being focused on said screen, with said stop blocking the portion of said light which is reflected from the undeformed portions of the surface of said membrane, wherein each deformed portion of said membrane over a given hole in said silicon oxide layer reflects light resulting in a bright spot on the screen of intensity:

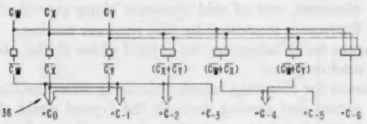
$$S = \frac{4\,S_o}{R^2} \int_0^R \frac{rdr}{R^2} (1 - \cos \phi)$$

where:
S_o = intensity on the screen with the stop removed;
R = radius of hole in the silicon layer;

$$\phi = \frac{4\pi\, y(r)}{\lambda R};$$

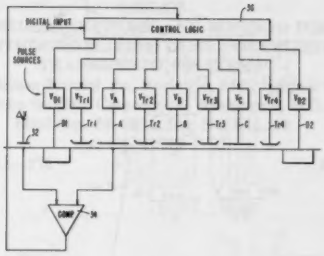
λ = the wavelength; and
$y(r)$ = describes the circularly symmetric deformation of the membrane at a distance r from the center of the hole.

4,087,811
THRESHOLD DECODER
Arnold Weinberger, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Feb. 25, 1976, Ser. No. 661,191
Int. Cl.² G06F *5/00*
U.S. Cl. 340—347 DD **6 Claims**



1. Binary data handling apparatus comprising:
n input signal lines comprised of,
p signal lines receiving the high order binary-weighted code signals, and *q* signal lines receiving the low-order binary-weighted code signals;
m output signal lines, each output signal line being associated with a value represented by the binary coding received by said *n* input signal line,
a threshold generator connected, and responsive to, said *n* input signal lines, and including a final logic level of *m* logic circuit means connected, and providing binary signals to, said *m* output signal lines,
whereby at least one threshold, related to the coded value on said *n* input signal lines is manifested by those of said *m* output signal lines on one side of the threshold having one binary condition, and those of said *m* output signal lines on the other side of the threshold having the other binary condition,
said threshold generator further comprising,
a first intermediate threshold generator having 2^p-1 intermediate output signal lines connected and responsive to, said *p* signal lines for generating a first intermediate threshold output signal,
a second intermediate threshold generator having 2^q-1 intermediate output signal lines, connected and responsive to, said *q* signal lines for generating a second intermediate threshold output signal, and
said final level of said threshold generator is comprised of, 2^n-1 logic circuit means, connected and responsive to said first and second intermediate output signal lines of said first and said second intermediate threshold generators.

4,087,812
DIGITAL-TO-ANALOG AND ANALOG-TO-DIGITAL CONVERTER CIRCUIT
Lewis Madison Terman, South Salem, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Dec. 23, 1975, Ser. No. 644,000
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 AD **9 Claims**

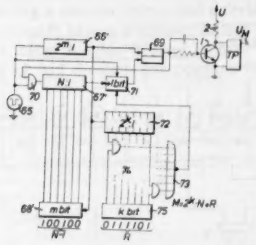


1. A circuit for converting analog signals or digital signals to digital or analog respectively comprising:
a charge transfer device including a plurality of charge storage means for storing predetermined discrete quantities of electrical charge carriers and means for selectively sharing the predetermined quantities of charge carriers in any one of said plurality of charge storage means with any adjacent one of said charge storage means by transferring selected amounts of said quantities of electrical charge carriers to be shared out of any one of said charge storage means and into any adjacent one of said charge storage means,
a control means connected to said charge transfer device for providing a sequence of control signal pulses to effect said selective sharing by transferring said quantities of electrical charge carriers, from out of any one of said charge storage means and into any adjacent one of said charge storage means,
said charge transfer device and said control means being responsive to an input analog signal or digital signal for producing a sequence of charge carrier transfers back and forth between adjacent charge storage means thereby resulting in a quantity of stored charge carriers manifesting said input signal in digital or analog respectively.

4,087,813
CIRCUIT FOR PRODUCING DIRECT VOLTAGES FROM PULSES
Willy Minner, Schwaigern, and Bernhard Rall, Ulm, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany
Filed Jul. 19, 1976, Ser. No. 706,480
Claims priority, application Germany, Oct. 31, 1975, 2548762; Jul. 17, 1975, 2531945
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 DA **9 Claims**

1. In a circuit arrangement for producing direct voltages lying within a direct voltage range from pulses fed to an integrating circuit at whose output the direct voltages (U_1) appear, particularly, to produce tuning voltages for a television or

radio receiver, comprising in combination: an integrating circuit; and pulse generating means, having its output connected to the input of said integrating circuit, for producing and feeding to said integrating circuit a number of constant amplitude pulses (I), whose total area is related to the desired circuit voltage output, distributed over a uniform number of subintervals within a period duration (T) assigned to the desired direct voltage range, with the period duration (T) being at least of the magnitude $T = (U_{max} - U_{min}) \cdot \Delta\tau/\Delta U_I$, where $(U_{max} - U_{min})$ is the desired direct voltage range, $\Delta\tau$ is the shortest time duration of a pulse (I), and ΔU_I is the smallest voltage step width associated with the shortest pulse time duration $\Delta\tau$ by which two different direct voltage values (U_I) at least differ from one another, said pulse generating means including means for selectively varying the pulse widths of said pulses (I) corresponding to the desired direct voltage U_I; the improvement



wherein said pulse generating means further includes a clock pulse generator for producing clock pulses having a pulse width of $\Delta\tau$, and wherein said means for selectively varying the pulse widths includes: a digitally controlled pulse ratio counter means, whose counting ratio can be varied externally by a certain value at given times and to which said clock pulses are fed, for producing pulse widths having an integer value $[M/P] \cdot \Delta\tau$, where M is an integer number which determines the desired direct voltage value (U_I) and P is the number of subintervals in said period duration T; and a pulse selection means which operates with the aid of number codes and is controlled by the remainder value R, where $R = M - [M/P] \cdot P$, where $[M/P]$ = the integer number value of M/P, said pulse selection means being connected to said ratio counter means for associating the R pulses as uniformly as possible to said subintervals P provided within said period duration and for varying, with said R pulses, the pulse ratio by a fixed value.

4,087,814

INTRUDER ALARM SYSTEMS

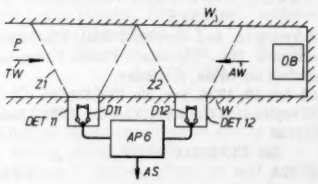
Ernst Spirig, Movenstrasse 37, CH-8640 Rapperswil, Switzerland

Filed Dec. 27, 1976, Ser. No. 754,351

Claims priority, application United Kingdom, Nov. 5, 1976, 46247/76

Int. Cl.² G08B *13/18*

U.S. Cl. 343—5 PD **4 Claims**



1. In an intruder detection system for detecting the presence of an intruder within a protected area, said system including a plurality of intruder detector means each individually responsive to the presence of an intruder within a zone of said protected area to provide a predetermined intruder-responsive signal, and alarm means responsive to the presence of a plurality of said intruder-responsive signals to develop an alarm signal; the improvement wherein said alarm means is operable only when said detector signals occur in a predetermined sequence logically representing the steps taken by an intruder to enter the protected area.

4,087,815

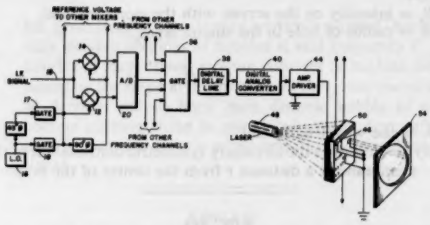
HYBRID DIGITAL-OPTICAL RADAR SIGNAL PROCESSOR

John B. Garrison, Silver Spring; James L. Queen, Bethesda, and David G. Grant, Laurel, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 10, 1969, Ser. No. 815,535

Int. Cl.² G01S *9/44*

U.S. Cl. 343—9 **16 Claims**



1. In combination with a radar having a transmitter section for transmitting a plurality of spaced frequencies during a period of time and a receiver section for processing said transmitted frequencies,

a hybrid digital-optical radar signal processor including a phase shifter unit having a plurality of crystal phase shifter elements, one of said elements being provided for each frequency processed by said receiver section,

means for illuminating the crystal phase shifter elements,

a readout plane,

means for directing beams emanating from the illuminating means and passing through the crystal phase shifter elements to impinge in a pattern upon the readout plane,

and means operatively connecting the radar receiver section to the phase shifter elements,

said last mentioned means producing a pattern on said readout plane which will have its maximum intensity at a position in said plane corresponding to the velocity and fine range of a target in the beam of said radar, in the event a coherent return from such a target is present.

4,087,816

VLF RADIO POSITION LOCATION SYSTEM

Andrzej Barszczewski, Ottawa, and Charles D. Hardwick, Manotick, both of Canada, assignors to Canadian Patents & Development Limited, Ottawa, Canada

Filed Oct. 22, 1976, Ser. No. 734,817

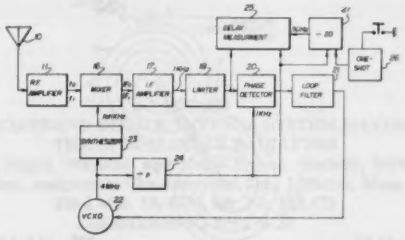
Claims priority, application Canada, Dec. 19, 1975, 242153

Int. Cl.² G01S *1/30, 5/14*

U.S. Cl. 343—105 R **6 Claims**

1. A low frequency radio position location system for aircraft or other vehicles and adapted for operating in conjunction with ground stations transmitting at a first radio frequency which is shifted in frequency by a small amount to a second radio frequency at fixed intervals, the shifting being carried out coherently with a defined transition point at the shifted time, said shifting frequency constituting a modulation frequency signal, comprising:

(a) an RF receiver and amplifier,
(b) limiting means connected to the amplifier for providing a square waveform output,
(c) a phase-locked loop connected to the limiting means for providing a continuous output frequency signal precisely locked to the first frequency,
(d) means for deriving a signal at the modulation frequency,



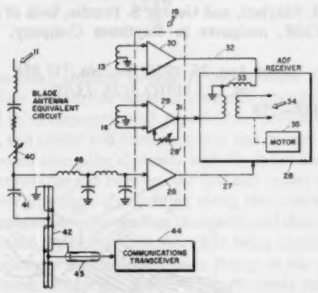
(e) phase comparison means for comparing the phase relationship of the derived modulation frequency signal to the phase relationship of the said output frequency signal and the second frequency signal, the said derived modulation frequency signal and its phase information then available for providing distance information in relation to said ground stations.

4,087,817

ADF ANTENNA

Joseph J. Sawicki; Lester R. Yates, both of Lighthouse Pt., and Reeves T. Shepherd, Margate, all of Fla., assignors to The Bendix Corporation, Southfield, Mich.

Filed Jan. 17, 1977, Ser. No. 759,709
Int. Cl.[2] G01S *3/42*
U.S. Cl. 343—117 R **4 Claims**



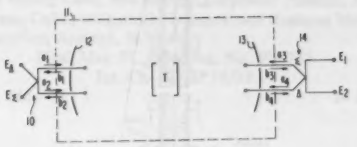
1. A combination communications, loop and sense antenna for a communications transceiver and an automatic direction finding radio receiver comprising:
a fixed loop antenna having a pair of windings disposed at right angles to one another in plane form, and adapted for mounting on an aircraft with the plane of said loop antenna parallel and adjacent to the skin of the aircraft;
a blade-like antenna supported with the planes of said loop and said blade intersecting perpendicularly, an electrostatic shield extending substantially coextensive with and parallel to the surface of said loop, said shield being interposed between said loop and the end of said blade antenna adjacent said loop;
a coupling circuit for connecting said blade-like antenna to said communications transceiver and to said direction finding receiver to provide sense signals therefor, said coupling circuit having a total impedance which is relatively low to signals in the very high frequency band and a partial impedance which is relatively low to signals in the low frequency and broadcast bands;
means connecting said communications transceiver through said total impedance of said coupling circuit to said blade-like antenna;
means connecting the sense signal input of said direction finding receiver through said partial impedance of said coupling circuit to said blade-like antenna;
means connecting said loop antenna to said direction finding receiver; and
a molded unitary housing of insulating material enclosing both said loop and said blade antenna, said housing having a streamlined exterior contour and being generally T-shaped in a cross-section taken in a plane intersecting the planes of both said loop and blade antennas.

4,087,818

LOSSLESS NETWORK AND METHOD FOR ORTHOGONALIZING DUAL POLARIZED TRANSMISSION SYSTEMS

Randall William Kreutel, Jr., Rockville, Md., assignor to Communications Satellite Corporation, Washington, D.C.

Filed Oct. 14, 1975, Ser. No. 622,360
Int. Cl.[2] H04B *7/02*
U.S. Cl. 343—176 **8 Claims**



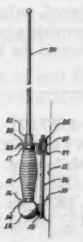
1. In a dual polarization transmission system including transmitting means for transmitting two signals having the same frequency but orthogonal polarizations and receiving means for receiving said two signals, a lossless network for orthogonalizing the received signals comprising first sum and difference hybrid means in said transmitting means for polarization coding said signals prior to transmission and second sum and difference hydrid means in said receiving means for polarization decoding said signals after reception.

4,087,819

ANTI THEFT APPARATUS FOR MOBILE RADIO ANTENNAS

Guerry M. Dalrymple, 4115 N. 57th Ave., Phoenix, Ariz. 85031

Filed Oct. 14, 1976, Ser. No. 732,465
Int. Cl.[2] H01Q *1/32*
U.S. Cl. 343—715 **10 Claims**



5. In threaded antenna mounting systems having a coupling, hexagonal in cross-section, interconnecting the antenna with the mounting platform extending from a mounting surface, the improvement comprising in combination:
a. a plate for circumscribingly receiving the coupling, said

plate including engagement means for non-rotatably engaging the coupling and precluding independent rotation between said plate and the coupling;

b. lock means for securing said plate adjacent an element of the mounting platform; and

c. said plate comprising:

i. a Z-shaped plate having first and second segments;

ii. said engagement means being disposed in said first segment and comprising a hexagonal hole dimensioned to mate with and receive the coupling; and

iii. said second segment including aperture means for receiving said lock means;

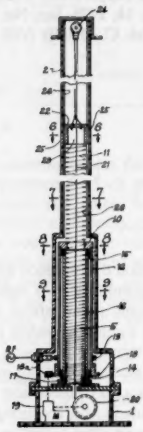
whereby, rotation of the coupling resulting in disengagement of the antenna is precluded by said plate and said lock means.

4,087,820

COLLAPSIBLE-HELIX ANTENNA

Albert L. Henderson, 920 Runnymead La., San Diego, Calif. 92106

Filed Feb. 4, 1977, Ser. No. 765,650
Int. Cl.² H01Q *1/36*
U.S. Cl. 343—752 **4 Claims**



1. A collapsible-helix antenna comprising: a helix of many turns, long compared with its diameter, and greatly expandible in length and pitch; means for separating the helix into two sections, the first of which is fixed in length and shorted-out wherein the turns of the helix are collapsed upon each other, the second of which is continuously variable in length wherein the helix has an approximately constant pitch and is a radiating element; a motor-driven helical-groove drive collar to drive the turns of the helix from either of said sections of the helix to the other section and a lanyard, pulley, windlass combination, driven by said motor, to provide a constant pitch to the helix in the variable length section as the length of the helix is continuously varied.

4,087,821

POLARIZATION CONTROLLABLE LENS

Harry Richard Phelan, Melbourne, Fla., assignor to Harris Corporation, Cleveland, Ohio

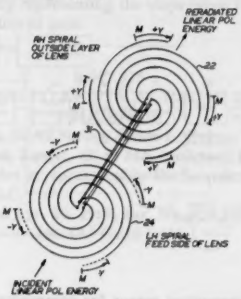
Filed Jul. 14, 1976, Ser. No. 705,282
Int. Cl.² H01Q *1/36*
U.S. Cl. 343—754 **10 Claims**

1. An antenna lens for receiving and re-radiating electromagnetic energy comprising:

first and second spaced apart antenna elements for respectively receiving and re-radiating electromagnetic energy;

Each said element comprising an even pair of electrically conductive spiral arms spaced from each other, said arms having a common axis of rotation, each said arm having inner and outer arm ends, said inner arm ends being rotationally displaced about said axis relative to each other by a given angle to achieve a given rotational phase progression about said common axis;

said first and second antenna elements being of opposite geometric winding sense;



transmission means including a plurality of conductors each interconnecting a said arm of said first element with an associated arm of said second element; and wherein,

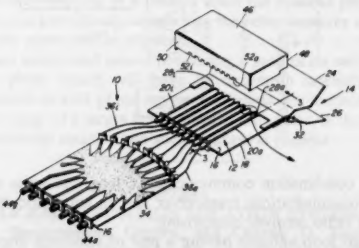
said outer arm ends of said first antenna element are different in length by a selected amount than said outer arm ends of said second antenna element whereby linearly polarized electromagnetic energy received and re-radiated by said lens experiences phase and polarization shifts substantially proportional to said selected amount.

4,087,822

RADIO FREQUENCY ANTENNA HAVING MICROSTRIP FEED NETWORK AND FLARED RADIATING APERTURE

Michael J. Maybell, and George S. Hardie, both of Santa Barbara, Calif., assignors to Raytheon Company, Lexington, Mass.

Filed Aug. 26, 1976, Ser. No. 717,855
Int. Cl.² H01Q *3/26, 13/08*
U.S. Cl. 343—778 **10 Claims**



1. A radio frequency antenna comprising:

a. a microstrip feed network including a dielectric board having a conductive ground plane formed on one side thereof and a plurality of feed elements formed on the other side thereof;

b. a flared radiating structure directly fed by such microstrip feed network such structure including a pair of conductive members, one being connected to the conductive ground plane and the other being connected to the plurality of feed elements; and,

c. a dielectric structure disposed in the narrow region of the flared radiating structure including a first dielectric means

for providing inpedance matching between the microstrip feed network and the radiating structure and a second dielectric means for providing impedance matching between the first dielectric means and the impedance of free space.

4,087,823

BROADBAND DIPOLE ANTENNA SYSTEM HAVING THREE COLLINEAR RADIATORS

Ivan Faigen, Wayland, and Ahmet Ergene, Boxboro, both of Mass., assignors to Chu Associates, Inc., Littleton, Mass.

Filed Mar. 19, 1976, Ser. No. 668,475
Int. Cl.² H01Q *9/16, 9/20*
U.S. Cl. 343—791 **10 Claims**

1. A broadband antenna having, in combination, three successive in-line cylindrical antenna elements comprising first, center, and third elements, with gaps defined between the first and center, and center and third elements; and coaxial feed-line means disposed along the elements with the inner line thereof extending across the gap between the first and center elements, and the outer line thereof extending along the center element to form a transmission line section therewith and then connecting with the third element, said outer line being insulated from said center element for radio frequency energy in the operating frequency band; the length of the in-line elements being large compared with the cross-section of the elements.

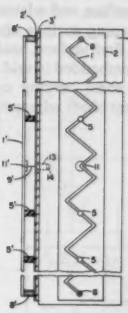
4,087,824

ASYMMETRICALLY FED ANTENNA ARRAYS

Andrew Alford, 71 Bacon St., Winchester, Mass. 01890

Filed Mar. 23, 1973, Ser. No. 344,422
Int. Cl.² H01Q *1/36, 9/16*
U.S. Cl. 343—806 **7 Claims**

1. A radiating means comprising an asymmetrically fed antenna, means for spacing the antenna from a metal panel by a distance 1/15 to ¼ wavelength long at the operating frequency, a feed point for the antenna intermediate the ends of said panel, centrally located conducting means extending substantially the length of the panel for spacing said panel from a metal sheet by a distance between 0.02 and 0.12 wavelengths at



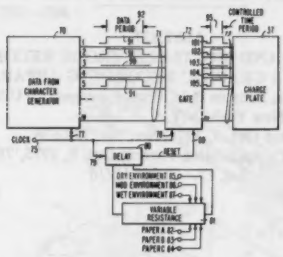
the operating frequency, said panel being substantially parallel to said metal sheet.

4,087,825

INK JET PRINTING INTENSITY MODULATION

Winston Hsong Chen, and Stanley Carpenter Titcomb, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 27, 1976, Ser. No. 690,763
Int. Cl.² G01D *15/18*
U.S. Cl. 346—75 **14 Claims**



1. The method of operating an ink jet printing system of the type wherein a pressurized fluid is supplied to at least one nozzle orifice and periodically perturbated to project therefrom a corresponding number of fluid filaments, each of which breaks into a series of drops, which drops are selectively caused to impact a recording medium to form print spots, the method comprising:

determining the print characteristic of said fluid with respect to the recording medium to be printed by said ink jet drops; and

controlling the volume of said fluid forming each of said print spots in response to said determined print characteristic.

4,087,826

PULSED ELECTRICAL PRINTER WITH DIELECTRICALLY ISOLATED ELECTRODE

Robert W. Haeberle, Acton, Mass., assignor to EPP Corp., Boston, Mass.

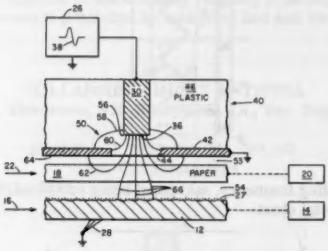
Filed Aug. 2, 1976, Ser. No. 710,892
Int. Cl.² G03G *15/048*
U.S. Cl. 346—155 **9 Claims**

1. Apparatus for pulsed electrical printing having, in combination,

a print electrode comprising a body of dielectric material

having a breakdown strength substantially greater than that of air, said body having a first surface, and a conductive member having a field shaping surface spaced from and facing said first surface and a lateral surface contiguous with the field shaping surface and extending therefrom away from said first surface, said field shaping and lateral surfaces being embedded in said dielectric material,

means to put a donor sheet bearing conductive printing particles and a recipient sheet adjacent to and facing said first surface, and



means to establish an electrical field of short duration between the particles and said conductive member, said field having sufficient amplitude to establish a current flow which charges said particles and causes them to detach from the donor sheet and move to the recipient sheet, but insufficient magnitude to produce a breakdown of said dielectric material between said first and field shaping surfaces.

4,087,827

ELECTRODE AND MULTI-ELECTRODE RECORDING HEAD FOR A GRAPHIC RECORDING APPARATUS

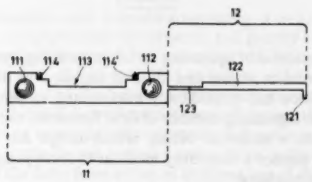
Guy Noël Martin, Sucy en Brie, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 7, 1976, Ser. No. 730,676

Claims priority, application France, Oct. 9, 1975, 75 30914

Int. Cl.² G03G *15/18*

U.S. Cl. 346—155 **8 Claims**



1. An electrode for a recording head comprising a plurality of metal electrodes, arranged in a side by side row and insulated relative to each other, for recording information on an electro-sensitive record carrier in a graphic recording apparatus, the carrier being transportable perpendicularly to the direction of the row, wherein the electrode is made from a unitary thin, metal plate and consists of mounting and bending portions,

the mounting portion having a width much greater than thickness and shaped so that it is suitable for assembly with other electrode mounting portions in a row aligned relative to each other to form the recording head, the assembly of the mounting portions serving as a carrier for a connecting member for electrically connecting the electrodes to associated power supply members; and

the bending portion being comparatively narrow and having a free end portion which is widened in the direction of width of the mounting portion to form a recording tip, a very narrow elongated resilient tongue, and a comparatively rigid arm extending between the free end portion and an end of the tongue, the other tongue end which is remote from the arm extending from the mounting portion.

4,087,828

PROCESS FOR THE STORAGE AND REPRODUCTION OF INFORMATION

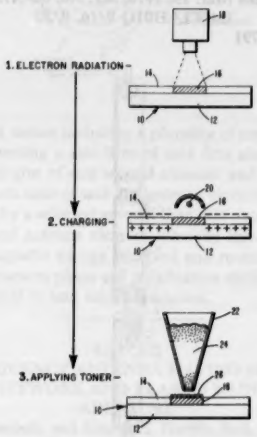
Erwin Lind, Auringen, and Dieter Messner, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed Feb. 21, 1973, Ser. No. 334,357

Claims priority, application Germany, Feb. 24, 1972, 2208727

Int. Cl.² H04N *1/30*

U.S. Cl. 346—158 **2 Claims**



1. A process for the storage and reproduction of information in which photoconductive recording material is altered by means of image-wise irradiating the surface of said recording material with an electron beam in correspondence with an information to produce a conductivity pattern and used for the reproduction of the information comprising irradiating uncharged photoconductive recording material in the absence of an electric field with an electron beam, applying to the thus produced conductivity pattern a free charge uniformly over the entire surface of the recording material in the absence of light and treating the surface of the recording material with an electrophotographic toner to make visible the charge pattern formed by said uniform charge.

4,087,829

EXPOSURE INDICATING DEVICES FOR USE IN MULTI-EXPOSURE CONTROLLED CAMERAS

Hiroshi Ueda, Nara, and Shigeru Oyokota, Sakai, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 25, 1976, Ser. No. 661,299

Claims priority, application Japan, Feb. 26, 1975, 50-22743; Mar. 1, 1975, 50-27203[U]; Dec. 22, 1975, 50-151829

Int. Cl.² G03B *7/08, 17/20*

U.S. Cl. 354—38 **21 Claims**

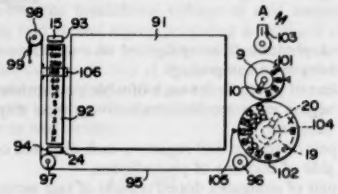
1. In a camera of the automatic shutter control type including: an objective lens; a diaphragm; a light measuring circuit for measuring the intensity of light passed through said objective lens and a diaphragm aperture formed by said diaphragm; a diaphragm-operating member movable between a cocked position in which said diaphragm is in its fully open position and a rest position in which said diaphragm is stopped-down; automatic stopping-down means for bringing said diaphragm-

operating member from its cocked position to its rest position before commencement of an exposure in response to shutter releasing operation; means for selecting a diaphragm aperture manually; a diaphragm-aperture determining means for setting said diaphragm to a selected diaphragm aperture in association with said diaphragm selecting means against the action of said automatic stopping-down means; and a first output circuit for producing a first output obtained by computation of the intensity of said light from said light measuring circuit and the film sensitivity to be used; an exposure indicating device comprising:

means for selecting a shutter speed;

a second output circuit for producing a second output corresponding to a selected shutter speed selected by and in association with the operation of said shutter speed selecting means;

a third output circuit for producing a third output obtained



by adding a signal representative of the diaphragm aperture selected by said diaphragm selecting means to the output of said first output circuit;

means for comparing said second and third outputs with each other to produce an output dependent on the result of the comparison;

first indicating means for indicating said selected shutter speed; and

second indicating means connected to said comparison means for indicating that a shutter speed to be obtained with said diaphragm stopped-down to the selected aperture is faster than the selected shutter speed, depending on the output from said comparison means; and

third indicating means connected to said comparison means for indicating that a shutter speed to be obtained with said diaphragm stopped-down to the selected shutter speed is slower than the selected shutter speed, depending on the output from said comparison means.

4,087,830

ARRANGEMENT FOR INDICATING THAT A SELECTED EXPOSURE VALUE IS TOO HIGH, TOO LOW OR PROPER

Eduard Wagensonner, Aschheim, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany

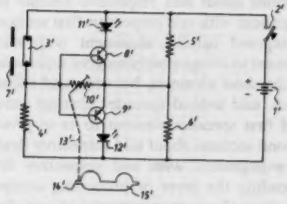
Filed May 10, 1977, Ser. No. 795,426

Claims priority, application Germany, May 14, 1976, 2621613

Int. Cl.² G08B *21/00*; G01J *1/44*

U.S. Cl. 354—60 L **4 Claims**

1. In a photographic camera provided with an exposure-value selector, in combination, first and second current source terminals for connection to a current source; a light-dependent first voltage divider connected across the current source terminals and comprised of at least one photosensitive means exposed to scene light and having a respective first voltage-divider tap; a light-independent second voltage divider connected across the current source terminals and comprised of light-independent resistor means and having a respective second voltage-divider tap; means for varying the light incident upon the photosensitive means in dependence upon the setting of the exposure-value selector; and an indicating arrangement for indicating when the selected exposure value is too high, too low or proper, comprising first and second transistors of complementary conductivity type having bases connected to each other and to the first voltage-divider tap, having emitters connected to each other and to the second voltage-divider tap and having collectors connected to respective ones of the current source terminals, first and second light-emitting diodes each connected in the collector-emitter circuit of a respective



one of the transistors, and an adjustable resistor connected between the bases and emitters of the transistors operative for establishing the difference in potential between the two voltage-divider taps at which one or the other of the transistors becomes conductive.

4,087,831

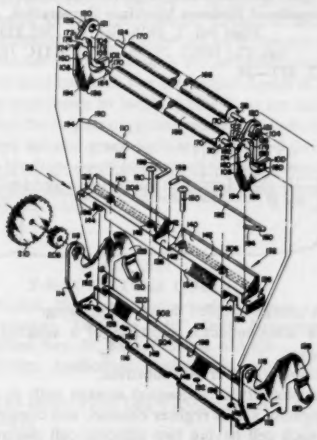
BEARING BLOCK MOUNT FOR A PHOTOGRAPHIC FLUID SPREADING APPARATUS

Leonard V. Bendoni, Framingham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Feb. 28, 1977, Ser. No. 773,005

Int. Cl.² G03B *17/50*; G03D *9/02*

U.S. Cl. 354—304 **11 Claims**



1. A photographic apparatus for providing a processing operating wherein a fluid processing composition is spread in a substantially uniform layer between a pair of superposed sheet elements at least one of which forms part of a film unit, comprising:

a pair of bearing blocks, each of said bearing blocks comprising a unitary piece structured to define first and second rigid sections interconnected by a thin flexible portion to accommodate pivotal movement of said second section towards and away from engagement with said first section;

means for fixedly stationing said first sections of said bearing blocks in spaced apart relation with respect to each other;

a first spreader element including an elongated sheet con-

tacting surface mounted between said spaced first sections of said bearing blocks;

a second spreader element including an elongated sheet-contacting surface mounted between said second sections of said bearing blocks whereby said second spreader element, in response to pivotal movement of said second sections about said respective flexible portions into engagement with said respective first sections, is moved into juxtaposed parallel alignment with said first spreader element to compressibly receive superposed leading edges of the sheet elements, between said sheet-contacting surfaces, said second spreader element moving away from said first spreader element so as to pivotally move said second sections about said respective flexible portions out of engagement with said respective first sections, for spreading the layer of processing composition between the sheet elements in response to said sheet elements advancing between said sheet-contacting surfaces; and

means for resiliently biasing said second sections of said bearing blocks toward respective engagement with said first sections whereby said second spreader element is urged into said juxtaposed parallel alignment with said first spreader element.

4,087,832

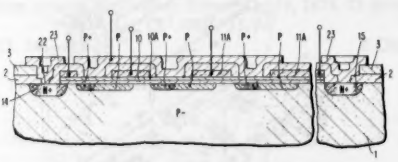
TWO-PHASE CHARGE COUPLED DEVICE STRUCTURE

Chakrapani G. Jambotkar, Hopewell Junction, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 2, 1976, Ser. No. 702,323

Int. Cl.² H01L *29/78, 29/04;* G11C *19/28*

U.S. Cl. 357—24 **14 Claims**



1. A charge coupled device comprising:

A. a semiconductor substrate of a selected conductivity type;

B. insulation over said substrate;

C. a plurality of sequential storage cells in said substrate forming a shift register channel, and comprising

D. each cell having two adjacent cell electrodes disposed downstream on said insulation along said channel, and with each cell including

E. a first ion implanted region in said substrate adjacent said insulation and extending from upstream distal end of said cell to an intermediate portion of the upstream one of said cell electrodes, with said first region comprising a substantially uniform distribution of a dopant of said conductivity type in greater concentration than in said substrate; and

F. a second ion implanted region forming an extension of said first region and continuing downstream in said channel to an intermediate portion of the downstream one of said cell electrodes, said second region having a substantial uniform distribution of a dopant of said conductivity type in concentration intermediate said substrate and said first region.

4,087,833

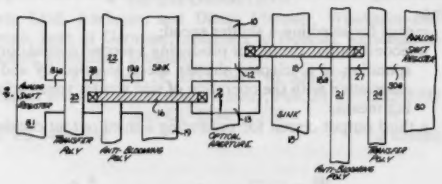
INTERLACED PHOTODIODE ARRAY EMPLOYING ANALOG SHIFT REGISTERS

Hsin Fu Tseng, Cupertino, Calif., assignor to Reticon Corporation, Sunnyvale, Calif.

Filed Jan. 3, 1977, Ser. No. 756,356

Int. Cl.² H01L *29/78, 27/14, 31/00;* H01J *39/12*

U.S. Cl. 357—24 **11 Claims**



1. A photodiode array formed on a substrate of a first conductivity type comprising:

a line of photodiodes each of which comprises a first doped region of a second conductivity type disposed in said substrate;

a pair of analog shift registers, each disposed on an opposite side of said line of photodiodes;

a pair of elongated doped regions of said second conductivity type disposed in said substrate, each disposed on said opposite sides of said line of photodiodes between said line of photodiodes and said registers;

a first pair of elongated conductive strips insulated from said substrate, each disposed on said opposite sides of said line of photodiodes between said elongated doped regions and said registers;

a second pair of elongated conductive strips insulated from said substrate, each disposed on said opposite sides of said line of photodiodes between said first elongated strips and said registers, said second strips spaced-apart from said first strips;

a plurality of second doped regions of said second conductivity type disposed in said substrate disposed between each of said spaced-apart first and second elongated strips;

a plurality of connector means for coupling photodiodes with said second regions such that alternate ones of said photodiodes are coupled to said second regions on said opposite sides of said line of photodiode;

whereby an interlaced photodiode array is formed which includes anti-blooming means and transfer means on each of said sides of said line of photodiodes.

4,087,834

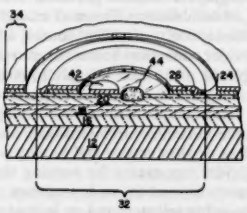
SELF-PROTECTING SEMICONDUCTOR DEVICE

Victor A. K. Temple, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 22, 1976, Ser. No. 669,403

Int. Cl.² H01L *29/74*

U.S. Cl. 357—38 **5 Claims**



1. In combination with a self-protected thyristor device including a p-type conductivity layer comprising the anode of

said device, an n-type conductivity layer overlying said p-type conductivity layer and forming a first p-n junction therebetween, a second p-type conductivity layer overlying said n-type conductivity layer and forming a second p-n junction therebetween, a second n-type conductivity layer of annular configuration overlying a portion of said p-type conductivity layer and forming the main emitter of said device, a pilot thyristor region including a third n-type conductivity layer of annular configuration also overlying said second p-type conductivity layer and within the annular configuration of said main emitter, said third layer forming the pilot emitter of said device, and a gate region including an electrode contacting said second p-type region within the annular region of said pilot emitter, the improvement comprising:

an etched region in said gate region, said etched region extending from the surface of said second p-type conductivity region for a sufficient depth in said second p-type region to reduce the breakdown voltage in said gate region below the breakdown voltage of said second p-n junction, said etched region providing a localized region of increased avalanche multiplication factor to insure that maximum current density at the onset of avalanche voltage breakdown occurs in the gate region, thereby causing said device to turn on in a controlled manner and prevent damage to said device.

4,087,835

PROJECTION TYPE COLOR TELEVISION SYSTEM

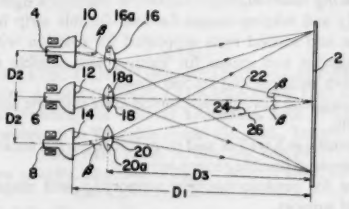
Itsuro Nishimura, and Yoshimasa Takahashi, both of Moriguchi, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 10, 1976, Ser. No. 749,281

Claims priority, application Japan, Dec. 11, 1975, 50-148051

Int. Cl.[2] H04N *9/31*

U.S. Cl. 358—60 **9 Claims**



1. A projection type color television system comprising:

a. projecting screen means;

b. three cathode ray tubes for projecting a color picture on said projecting screen means, each of said three cathode ray tubes having a phosphor screen for producing and projecting onto said projecting screen means a different one of the three primary colors of a light beam containing image information in said beam, said three cathode ray tubes being positioned to have respective phosphor screens placed on a first imaginary plane in a parallel relation to said projecting screen means and in alignment with each other along a first imaginary line parallel to a horizontal scanning direction of said light beam; and

c. three optical lens means, each provided in front of said phosphor screen and between said projecting screen means and said cathode ray tube for focusing said beam on said projecting screen means, said three optical lens means being positioned to have respective principle planes on a second imaging plane in a parallel relation to said projecting screen means, and in alignment with each other along a second imaginary line which is parallel to said first imaginary line, said lens means being positioned such that the center of said phosphor screen of each cathode ray tube, the center of corresponding lens means and the center of said projecting screen means are in alignment with each other.

4,087,836

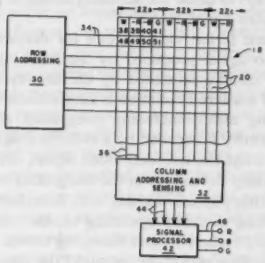
SIGNAL PROCESSING FOR AN IMAGING DEVICE

Douglas Nelson DeFoe, Winnetka, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Jan. 7, 1977, Ser. No. 757,522

Int. Cl.[2] H04N *3/14, 9/04*

U.S. Cl. 358—44 **20 Claims**



1. In an imaging device having rows of horizontally spaced sets of light-sensitive picture elements, each such element in a set of picture elements generating an electrical output signal in response to one or more of the red, blue and green components of incident light, a method of generating an electrical signal representative of the blue component of light incident upon selected pairs of picture elements of a selected set, comprising:

a. detecting the outputs of the selected pairs of picture elements and the outputs of all other picture elements in the selected set and the outputs of a pair of picture elements in an adjacent set; and

b. combining the detected outputs of all picture elements in said selected set with the detected outputs of the pair of picture elements in the adjacent set such that the outputs of the selected picture elements are included twice in the combined total and such that the output signals of picture elements responsive to incident blue light are added together and the outputs of picture elements responsive only to incident red and green light are subtracted therefrom;

whereby a resultant signal is obtained which is proportional to the blue component of light incident upon the selected pair of picture elements.

4,087,837

X-RAY PICTURE CODING

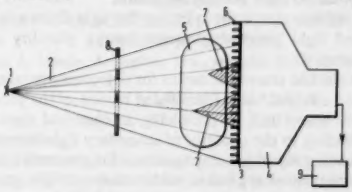
Ronald Jan Geluk, Nootdorp, Netherlands, assignor to N. V. Optische Industrie "De Oude Delft", Delft, Netherlands

Filed Nov. 20, 1975, Ser. No. 633,979

Claims priority, application Netherlands, Nov. 26, 1974, 7415409

Int. Cl.[2] H04N *3/00*; G01N *23/20*; G02B *5/18*

U.S. Cl. 358—111 **4 Claims**



1. A system for forming a video display of an X-ray picture of a body comprising

a source of X-rays for transmitting X-rays through the body,

an X-ray screen for receiving the X-rays that pass through the body,

a video circuit including scanning means for scanning the screen and producing a video signal and including display means for displaying the output thereof,

a plate positioned between the source of X-rays and the body, the plate having a spatial variation in its transparency to X-rays to cause the scanning means to produce an encoded video signal, and

decoding means in the video circuit for decoding the encoded video signal produced by the scanning means so that in the display produced by the display means, the influence of scattered radiation is substantially eliminated, the decoding means including integrating and sample-holding circuitry controlled by a reference signal to periodically average the encoded video signal, first clamping means to clamp the output of the integrating and sample-holding circuitry synchronously with the reference signal, sample-holding circuitry operating on the output of the first clamping means, second clamping means for clamping over the same period the output of the sample-holding circuitry with the encoded video signal from the screen, and controlled amplifying means for amplifying the signal produced by the second clamping means with a variable gain to compensate for the encoding of the plate.

4,087,838

APPARATUS FOR OBTAINING A LIGHT CARRYING INFORMATION THEREWITH

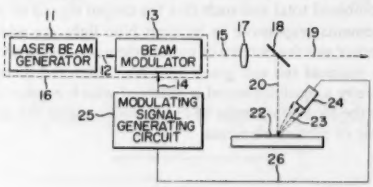
Katsumi Masaki, Kodaira, and Takeshi Goshima, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 20, 1976, Ser. No. 707,058

Claims priority, application Japan, Jul. 25, 1975, 50-90919; Jul. 25, 1975, 50-90920; Aug. 7, 1975, 50-96207; Sep. 10, 1975, 50-109810

Int. Cl.² H04N *1/28*

U.S. Cl. 358—199 **28 Claims**



1. An apparatus for obtaining an information-carrying light comprising:

modulated light generated means emitting light having an intensity variable in accordance with a modulating signal applied thereto;

deflector means for deflecting the light emitted from said modulated light generating means;

light splitter means for splitting the light from said modulated light generating means into a plurality of light beams;

photoelectric converter means for detecting secondary light from material being illuminated by one of the plurality of light beams and for producing an electrical signal corresponding to the quantity of secondary light detected;

modulating signal generating means for generating the modulating signal applied to said modulated light generating means in order that the quantity of light detected by said photoelectric converter means is substantially constant; and

mixer means for mixing an extraneously applied electrical signal and the output of said modulating signal generating means and for applying the mixed signals to said modulated light generating means.

4,087,839

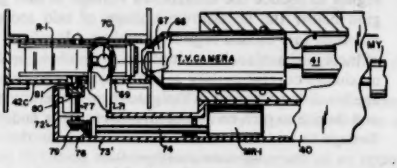
FILMSTRIP TRANSDUCING APPARATUS AND METHOD

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation of Ser. No. 521,028, Nov. 5, 1974, Pat. No. 3,970,775, which is a continuation-in-part of Ser. No. 295,807, Oct. 10, 1972, Pat. No. 3,881,053, which is a continuation-in-part of Ser. No. 224,131, Feb. 7, 1972, Pat. No. 3,699,266, which is a continuation-in-part of Ser. No. 142,748, Aug. 28, 1961, Pat. No. 3,646,258, which is a division of Ser. No. 515,417, Jun. 14, 1955, Pat. No. 3,003,119. This application Jul. 19, 1976, Ser. No. 706,506

Int. Cl.² G11B *7/00*; H04N *7/18*

U.S. Cl. 358—214 **4 Claims**



1. Transducing and drive means for record tape provided in cartridges comprising in combination:

a support,

a magazine containing an elongated flexible strip of record bearing material,

supply and take-up means for said flexible strip including first and second reels supported for rotation within said magazine and means for guiding said flexible strip between said first and second reels,

said magazine having walls surrounding said first and second reels,

an opening in a wall of said magazine to permit access to said elongated flexible record strip,

means for predeterminately supporting said magazine on said support,

transducing and drive means supported for movement adjacent said magazine when said magazine is predeterminately supported on said support,

first and second coupling means supported by said support and movable after a magazine has been predeterminately located on said support to effect driving coupling with said first and second reels of said magazine,

separately operable motor means for driving said first and second coupling means,

a transducer movably supported by said support and movable thereon into opertive relation with a section of said flexible strip exposed to the exterior of said magazine through said opening to permit the transducer to transduce signals with respect to said strip,

third coupling means coupleable to a portion of said tape located between said first and second reels for engaging said tape,

first motor means for operating said first coupling means to drive said reel for taking up the tape thereon,

second motor means for operating said second coupling means to drive said second reel for taking up the tape thereon,

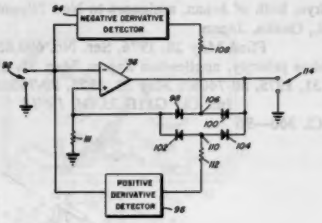
third motor means for operating said third coupling means,

said third motor means being reversibly operable to operate said third coupling means in driving said record strip from either said first or said second reel means.

4,087,840
METHOD AND APPARATUS FOR MAGNETICALLY RECORDING AND REPRODUCING PHYSIOLOGICAL INFORMATION

Ronald J. Zdrojkowski, and Richard L. Longini, both of Pittsburgh, Pa., assignors to Carnegie-Mellon University, Pittsburgh, Pa.

Filed Jun. 16, 1976, Ser. No. 696,717
Int. Cl.[2] G11B 5/09
U.S. Cl. 360—41 **6 Claims**

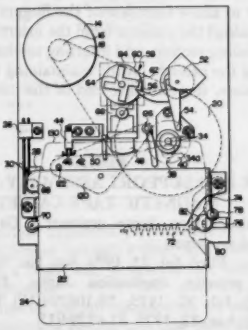


1. A method for detecting zero crossings of a signal recorded on magnetic tape as a train of discrete pulses, the method comprising the steps of: moving the recorded magnetic tape past a playback head so a playback signal is generated by the playback head; sensing the precise instants when the playback signal crosses zero; developing a first time derivative signal from the playback signal; sensing high amplitude derivative signals which exceed a predetermined threshold level; determining the simultaneous occurance of sensed zero crossing and sensed high amplitude derivative signals; and developing an output signal having level transitions upon each determination of a simultaneous occurrence of a sensed zero crossing and a sensed high amplitude derivative signal.

4,087,841
AUTOMATIC CARTRIDGE-REJECTING APPARATUS FOR A CARTRIDGE TAPE-PLAYING DEVICE

Shinsaku Tanaka, and Takashi Yamanaka, both of Tokyo, Japan, assignors to Tanashin Denki Co., Ltd., Tokyo, Japan

Filed May 12, 1976, Ser. No. 685,612
Claims priority, application Japan, Aug. 5, 1975, 50-95273
Int. Cl.[2] G11B 23/04, 25/06
U.S. Cl. 360—71 **1 Claim**



1. An automatic cartridge-rejecting apparatus for a cartrdige tape-playing device, comprising:

a cartridge loading unit including an engagement member for elastically locking a cartridge, having a recess provided on the outside of the cartridge, by being fitted into said recess;

driving means for rotating a capstan;

electric signal-generating means for sending forth a cartrdige rejection-instructing signal, each time an endless tape is transported over any or all of the tracks formed on the endless tape;

an automatic cartridge-rejecting cam mechanism including a smaller gear wheel on the driving means, a larger gear wheel capable of engagement with the smaller gear wheel and normally standing at rest with a notched portion of the larger gear wheel disposed to face the smaller gear wheel while an automatic cartridge-rejecting function is not performed, an automatically operable rejecting cam on the larger gear wheel, a pressing means normally urging the larger gear wheel in a prescribed direction, said pressing means comprising an inclinded plane of a V-shaped recess formed on a ring-shaped ridge mounted to the larger gear wheel and a driving member normally disposed within the V-shaped recess to press the inclined plane and to be pushed out of the recess after rotation of the larger gear wheel to slide on the surface of the ring-shaped ridge, a stopper means normally engaged with the larger gear wheel to stop rotation of the larger gear wheel, said stopper means comprising a stepped portion formed on the inner peripheral wall of the ring-shaped ridge and a start-stop member normally engaged with the stepped portion, and an automatic rejection initiating means driving the start-stop member to be disengaged from the stepped portion and allow the driving member to push the larger gear wheel to be engaged with the smaller gear wheel so as to continue the rotation of the larger gear wheel, said initiating means including a magnet driving the start-stop member in response to an electric signal;

a cartridge-pushing mechanism fixed to a cam follower driven by said rejecting cam and pushing the tip portion of the cartridge so as to push the cartridge from the cartridge loading portion to be released from the elastic locking said cartridge-pushing mechanism including a cam follower cooperating with the cam, a rotary member fitted to the cam follower and having one end pivoted, and a driving rod pushing the tip portion of the cartridge;

a first contact unit serving to connect a power source to the driving means when the cartridge has been loaded in the cartridge-loading portion; and

a second contact unit disposed in parallel with the first contact unit, normally kept open by the motion of the driving member entering the V-shaped recess, and closed when the automatic rejection is performed by the motion of the driving member pushed out of the V-shaped recess so as to keep the power source connected to the driving means until the driving piece enters again the V-shaped recess regardless of the state of the first contact unit.

4,087,842
RECORDING TRACK ECCENTRICITY COMPENSATION METHOD AND MEANS

William A. Manly, Arlington, Tex., assignor to Graham Magnetics Inc., Graham, Tex.

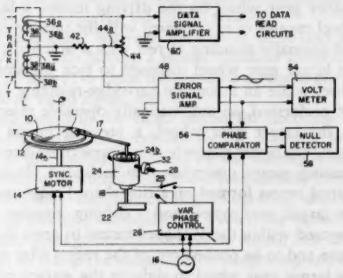
Filed Nov. 5, 1976, Ser. No. 739,058
Int. Cl.[2] G11B 21/10, 21/24
U.S. Cl. 360—77 **20 Claims**

1. The method of compensating for eccentricity in a circular or spiral recording track on a recording member rotating about an axis during playback comprising the steps of

A. moving the playback transducer in a circular path opposite the track on the recording member,

B. adjusting the radius of the circular path to equal the distance between the axis of rotation of the recording member and the center of the eccentric track, and

C. controlling the movement of the transducer in phase to correspond to the phase angle of the instantaneous position of the track center about the axis of rotation of the recording member.



4,087,843

POSITIONING DEVICE FOR THE ACCESS ARM OF THE MAGNETIC HEAD OF A MAGNETIC DISK STORAGE

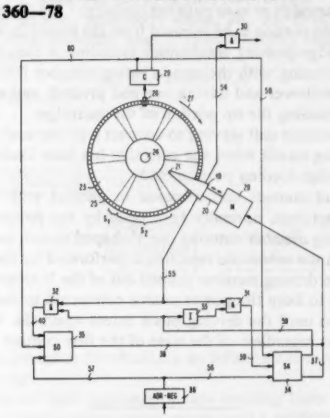
Helmut P. Louis, Sindelfingen; Arno Matla, Waldenbuch; Karl Heinz Schaller, Herrenberg, and Volker Zimmerman, Schoenaich, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 10, 1976, Ser. No. 722,183

Claims priority, application Germany, Dec. 23, 1975, 2558359

Int. Cl.[2] G11B *21/08, 21/10, 5/56*

U.S. Cl. 360—78 **18 Claims**



1. Positioning device for the access arm of the magnetic head of a magnetic disk storage, which is positionable onto selective track addresses of the magnetic disks, with control of the magnetic head position for the track following by means of servo markings which are arranged at the magnetic disk in servo sectors of the recording tracks, staggered relative to each other in track direction and covering twice the width of a recording track, with a switching device which is synchronized with the disk rotation, and which, upon the sensing of the servo sectors by the magnetic head, applies the sensed servo signals in predetermined intervals to a servo circuit, characterized in that:

the servo markings of magnetic disk marking areas follow each other in track direction are provided one beside the other in spacings of one respective width of a recording track in radial direction of the magnetic disk;

servo markings arranged one behind the other in track direction in amounts of arc lengths with angular spacings are provided one following the other and staggered by one respective width of a recording track; and

at least three servo markings arranged one following the other in track direction over the center of marking lines are associated to successive track addresses.

4,087,844

TAPE RECORDERS WITH CASSETTE LOADING AND EJECTING MECHANISMS

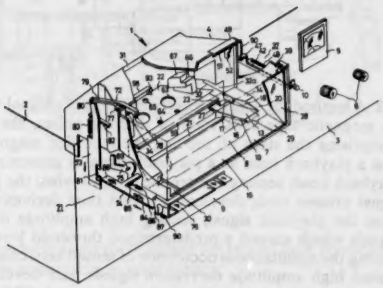
Choku Takahashi, Higashi-Yamato, and Katsutoshi Kinoshita, Tokyo, both of Japan, assignors to New Nippon Electric Co., Ltd., Osaka, Japan

Filed May 28, 1976, Ser. No. 690,853

Claims priority, application Japan, May 31, 1975, 50-65553; May 31, 1975, 50-74067; May 31, 1975, 50-74068

Int. Cl.[2] G11B *23/04, 19/18*

U.S. Cl. 360—96 **13 Claims**



1. A cassette tape recorder comprising a cassette loading section wholly containing a cassette loading platform rotatably mounted at one end thereof, means for normally maintaining said cassette loading platform at an inclined position at the time of inserting a cassette into the tape recorder with the other end of the platform maintained at a higher level than said one end, said means permitting said platform to rotate to the horizontal position, a fixed guide member having a vertical guide surface along which said cassette is led for loading said cassette at a predetermined operating position when said cassette loading platform is rotated to the horizontal position, and a cassette inserting section provided with an opening thereto for inserting the cassette, said opening having a sufficiently large width and height to allow insertion of the fingers of the operator to load and unload the cassette from the inserting section into the cassette loading section, said inserting section having shoulders for guiding the cassette, while maintaining the same at a horizontal posture, to said other end of the cassette loading platform.

4,087,845

TAPE PAD SUPPORT ASSEMBLY FOR USE IN MAGNETIC TAPE CASSETTES

Shoichi Saito, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jul. 22, 1976, Ser. No. 707,631

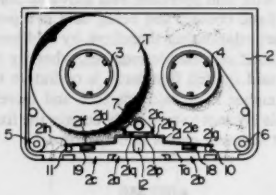
Claims priority, application Japan, Jul. 29, 1975, 50-104897[U]; Jul. 31, 1975, 50-106794[U]; Dec. 13, 1975, 50-168247[U]; Apr. 12, 1976, 51-45294[U]

Int. Cl.[2] G11B *15/08, 15/60*

U.S. Cl. 360—130 **6 Claims**

1. In a magnetic tape cassette having a window slot formed centrally in the front end face of the cassette for receiving a pinch roller, a pair of window slots located symmetrically on the opposite sides of the first mentioned window slot for receiving magnetic heads, and an aperture located in the cassette toward said front end face in alignment with the window slot for the pinch roller for receiving a capstan, said cassette also

including a tape supply hub carrying a length of magnetic tape disposed thereon and a tape take-up hub on which the tape is taken up after it has run along the respective window slots with its plane disposed parallel to the plane of the window slots; a tape pad support assembly comprising a spring abutment integrally formed with the cassette and located immediately behind the capstan aperture, a pad carrying leaf spring formed of a resilient sheet material and disposed on the rear side of the tape which runs along the respective window slots, the spring including a central portion on which a pair of nipples or dow-



els are formed for abutment against the spring abutment to define a pair of fulcrums, the spring also including a detent member located adjacent to the central portion and adapted to engage the spring abutment, and the spring further including a pair of end portions which extend from the central portion to positions behind the respective window slots associated with the magnetic heads, and a pair of tape pads secured to the end portions of the leaf spring for urging the tape against a magnetic head or heads as the latter is advanced into the associated window slot or slots.

4,087,846

PROTECTIVE CIRCUIT APPARATUS

W. Taliaferro Hughes, 1519 Country Club Rd., Wilmington, N.C. 28401, and Stewart P. Barrett, Jr., 3417 Walton Way Ext., Augusta, Ga. 30317

Filed Oct. 27, 1976, Ser. No. 735,938
Int. Cl.[2] H02H *3/10*
U.S. Cl. 361—42 **6 Claims**

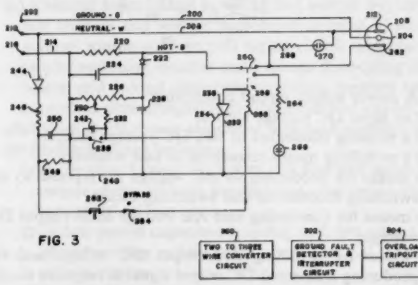

GROUND - G
NEUTRAL - W
HOT - B
TWO TO THREE WIRE CONVERTER CIRCUIT
GROUND FAULT DETECTOR & INTERRUPTER CIRCUIT
OVERLOAD TRIPOUT CIRCUIT

FIG. 3

1. Protective circuit apparatus for an electrical device supplied by electrical power through a three line electrical supply system including a high line, a neutral line and a housing ground line, comprising:

an overload trip-out circuit adapted to be connected between said electrical device and said three line electrical supply system for sensing current in excess of a selectable pre-determined value including means for disconnecting power to said electrical device when said sensed current exceeds said selected pre-determined value;

a ground fault detection and interrupter circuit connected in series with said overload trip-out circuit between said electrical device and said three line electrical supply system, said ground fault detection and interrupter circuit means including means for sensing current flow in excess of a pre-determined value through a housing ground line, said sensing means further including a resistance connected in series in the ground housing line, said ground fault detection and interrupter circuit further including means responsive to said sensing means for disconnecting power to said electrical device, said means responsive to said sensing means including a discharge device triggerable in response to the output of said sensing means, said discharge being connected to energize a switch means when triggered, said switch means disconnecting power to said electrical device; and

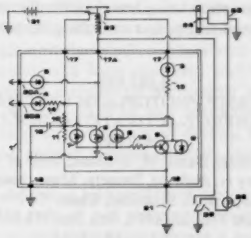
a two to three wire converter circuit adapted to be connected between said three line electrical supply and said electrical device in series with said overload trip-out circuit and said ground fault detection and interrupter circuit, said two to three wire converter circuit being adapted to be connected to an electrical supply having at least a high and a neutral connection, said two to three wire converter circuit having its output connected in series with the ground fault detection and interrupter circuit and the overload trip-out circuit, said two to three wire converter circuit enabling power flow only if the lines are properly connected with the neutral and high lines of the supply.

4,087,847

SOLID-STATE ELECTRONIC SAFETY DEVICE

William C. Willett, P. O. Box 7387, Mobile, Ala. 36607

Filed Sep. 9, 1976, Ser. No. 721,772
Int. Cl.[2] H02H *3/24*
U.S. Cl. 361—92 **2 Claims**



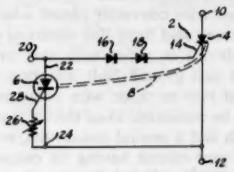
1. Interposed in an electrical system which includes an electric power source having substantially constant voltage output while under normal load conditions such as a storage battery which is continuously having its charge maintained or replenished during use or an electric generator power supply, an electric apparatus load circuit, and an electromatic switching relay for connecting said power source to said load circuit to energize same; a solid-state electronic safety device for protection against the danger of fire originating in said apparatus load circuit comprising, in combination: a first solid-state electronic circuit means for initially actuating said relay to connect said load circuit to said constant-voltage power source; a second solid-state electronic circuit means which includes components of said first circuit means for maintaining actuation of said relay in said load circuit connecting condition under normal load drain from said constant voltage power source; and a solid-state electronic circuit voltage sensing means for deactuating said relay to disconnect said load circuit from said constant voltage power source should danger of fire occur by reason of excessive electric current drain due to defect or malfunction in said apparatus load circuit.

4,087,848

THERMALLY SELF-PROTECTED POWER SWITCHING SEMICONDUCTOR DEVICE

Roy Hyink, Wauwatosa; Stanley V. Jaskolski, Sussex; Robert W. Lade, Waukesha; Herman P. Schutten, Elm Grove, and Gordon B. Spellman, Mequon, all of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Sep. 20, 1976, Ser. No. 725,105
Int. Cl.[2] H02H 5/04
U.S. Cl. 361—103 21 Claims



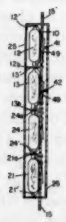
1. A thermally self-protected power switching semiconductor device comprising:
- a power switching thyristor having a pair of main terminals for carrying load current and a gate for controlling the conduction state thereof;
- a gate terminal electrically connected to said gate for carrying signal current thereto;
- a temperature sensitive thyristor thermally coupled to said power switching thyristor and electrically connected to said gate terminal in parallel with said gate, said temperature sensitive thyristor being thermally actuatable to intrinsically switch between high and low resistance states such that said temperature sensitive thyristor senses a predetermined temperature of said power switching thyristor and automatically responds thereto by switching to said low resistance state to shunt said gate, said predetermined temperature being less than the thermal breakover temperature of said power switching thyristor.

4,087,849

MULTILAMP PHOTOFLASH UNIT HAVING RADIANT-ENERGY-ACTIVATED QUICK-CONNECT SWITCH

William T. Colville; David W. Mecone, both of Williamsport, Pa., and Emery G. Audesse, Beverly, Mass., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Feb. 25, 1977, Ser. No. 772,055
Int. Cl.[2] G03B 15/02
U.S. Cl. 362—13 21 Claims



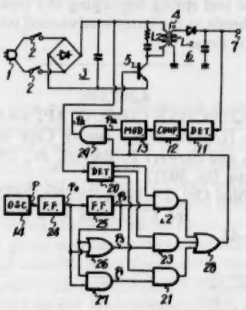
1. In a multilamp photoflash unit containing a plurality of flashlamps and a printed circuit board having electrical circuitry thereon for sequentially igniting said flashlamps, at least one radiant-energy-activated quick-connect switch included in said circuitry, said switch having a normally open configuration and being arranged in series with a second one of said flashlamps for providing a closed circuit thereto in response to the ignition of a first one of said flashlamps, said switch comprising:
- an aperture through said circuit board in alignment with said first flashlamp;
- a support member of fusible material extending across said aperture and attached to said circuit board;
- a fixed contact attached to a first portion of said circuitry; and
- a resilient movable contact attached at one end to a second portion of said circuitry and having a bent segment at the other end which contacts said fusible support member in alignment with said aperture, said movable contact overlying said fixed contact and being held in a preenergized spaced-apart relationship therefrom by said bent segment bearing against said fusible member, whereby the radiant output of said ignited first lamp is operative to fuse the support member from said aperture and thereby release the movable contact to resiliently engage the fixed contact as the bent segment enters said aperture.

4,087,850

POWER SUPPLY CIRCUIT

Akio Koizumi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 21, 1977, Ser. No. 760,973
Claims priority, application Japan, Jan. 29, 1976, 51-8684
Int. Cl.[2] H02M 3/335
U.S. Cl. 363—21 5 Claims



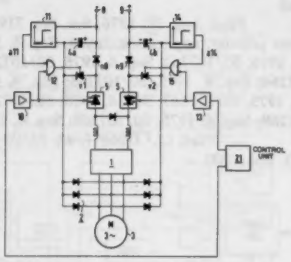
1. A power supply circuit comprising:
(a) an input DC voltage source;
(b) a winding connected to said DC voltage source;
(c) a switching means connected to said winding;
(d) means for producing an AC voltage in response to the switching function of said switching means;
(e) means for converting said AC voltage to an output DC voltage;
(f) means for detecting said output DC voltage and for producing a detected DC output signal in response to said output DC voltage;
(g) an oscillator for generating pulse signals;
(h) a modulator supplied with said pulse signals and said detected DC output signal and for producing pulse width modulated signals in response to said detected DC output signal;
(i) means for supplying said pulse width modulated signals to said switching means; and
(j) means for limiting a maximum value of the duty ratio of said pulse width modulated signal, said limiting means including means for frequency-dividing said pulse signals from said oscillator and an AND-gate circuit which is supplied with an output signal from said frequency-dividing means and with the pulse width modulated signal from said modulator, for supplying an AND-gate output to said supplying means.

4,087,851

CIRCUIT ARRANGEMENT FOR SUPPLYING AN INDUCTIVE LOAD

Herwig Klautschek, Furth, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 30, 1976, Ser. No. 682,152
Claims priority, application Germany, May 6, 1975, 2520158
Int. Cl.[2] H02M 7/515
U.S. Cl. 363—96 3 Claims



1. A circuit arrangement for supplying an inductive load from a d-c voltage source, said voltage source having first and second output terminals, said circuit arrangement comprising:

(a) a self-controlled inverter with forced commutation, said inverter having valve branches which can be fired and extinguished and having first and second d-c inputs and a-c outputs;

(b) a first series circuit coupling said first output terminal of said d-c voltage source and said first d-c input of said inverter, said first series circuit comprising a first decoupling diode, a first electronic switching member and a smoothing choke where said first electronic switching member can be controlled alternatingly into conduction and cutoff;

(c) a second series circuit coupling said second d-c input of said inverter and said second output terminal of said d-c voltage source, said second series circuit comprising a second switching member and a second decoupling diode, where said second electronic switching member can be controlled alternatingly into conduction and cut-off;

(d) bypass diode means associated with said inverter; and

(e) feedback means including:

(1) a rectifier having a-c inputs and first and second d-c output ports, said a-c inputs being coupled to the a-c outputs of said inverter;

(2) a first partial capacitor coupling said first output port of said rectifier and said first output terminal of said d-c voltage source;

(3) a second partial capacitor coupling said second output port of said rectifier and said second output terminal of said d-c voltage source;

(4) a first controllable electronic valve coupled in a first series arrangement with said first partial capacitor, said first series arrangement being coupled in parallel to said first decoupling diode;

(5) a second controllable electronic valve coupled in a second series arrangement with said second partial capacitor, said second series arrangement being couple in parallel to said second decoupling diode; and

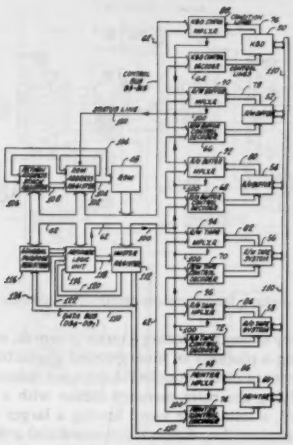
(6) first and second means responsive to the voltage across said respective first and second partial capacitors for firing said first and second controllable valves respectively.

4,087,852

MICROPROCESSOR FOR AN AUTOMATIC WORD-PROCESSING SYSTEM

Kenneth C. Campbell, Dallas; Werner Schaer, Richardson, and Harry W. Swanstrom, Dallas, all of Tex., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 2, 1974, Ser. No. 430,130
Int. Cl.[2] G06F 9/20, 3/00
U.S. Cl. 364—200 12 Claims



1. A microprocessor which communicates with a plurality of peripheral devices via a data bus and an instruction word bus, said microprocessor having a read-only-memory (hereinafter abbreviated ROM) which generates a plurality of instruction words on said instruction word bus in response to a corresponding ROM address, said microprocessor including an arithmetic logic unit (hereinafter abbreviated ALU) for performing arithmetic and logic functions, said microprocessor further including a plurality of addressable general purpose data storage registers, each of said instruction words being applied in parallel to said peripheral devices, said ROM, said ALU and said general purpose registers, said combination comprising:

means for addressing said peripheral devices,

means within each of said peripheral devices which is responsive to said means for addressing and is further responsive to instruction words transmitted over said instruction word bus to effect a predetermined operation when a control command is specified by said instruction words and to provide a status condition when a status check command is specified by said instruction words,

means responsive to said status condition to specify a predetermined succeeding ROM address to be applied to said ROM,

means within said ALU and said general purpose data storage registers responsive to instruction words to effect a predetermined data processing operation on data transmitted over said data bus from said peripheral devices when a data processing command is specified by said instruction words and to provide a test condition result when a test data command is specified by said instruction words,

means responsive to said instruction words for determining which general purpose register will have its contents processed by said ALU and

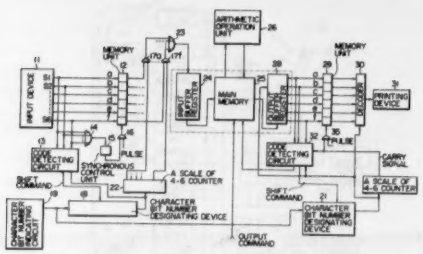
means responsive to said test condition result to specify a predetermined succeeding ROM address to be applied to said ROM.

4,087,853

STORAGE RECONFIGURATION APPARATUS

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 525,103, Nov. 19, 1974, abandoned.
This application Sep. 20, 1976, Ser. No. 724,622
Claims priority, application Japan, Nov. 20, 1973, 48-130421; Nov. 20, 1973, 48-130423
Int. Cl.[2] G06F *13/00*
U.S. Cl. 364—200 5 Claims



1. An information transmission-controlling device comprising:

main memory means for storing a series of words, each word comprising a plurality of binary-coded characters;

information input means coupled to the main memory means for supplying the main memory means with a numeral-type word, a letter-type word having a larger character bit number than the numeral-type word and a word-positioning code interposed between any adjacent two words;

means for generating character bit number-indicating signals corresponding to the number of bits which constitute the characters of each word;

character bit number memory means coupled to said generating means for storing character bit number-indicating signals distinguishing between the number of character bits constituting each letter type word and the number of character bits constituting each numeral type word, in a programmed order identical with the order in which the letter type and numeral type words have been delivered from the information input means;

means coupled to said information input means and to said character bit number memory means for detecting a word-positioning code delivered from the information input means and for supplying, upon detection of a word-positioning code, to said character bit number memory means a shift command for causing character bit number-indicating signals to be read out from said character bit number memory means one by one in said programmed order;

circuit means coupled to said character bit number memory means for determining the character bit number of each word being delivered to said main memory means from the information input means, upon receipt of a character bit number-indicating signal read out from said character bit number memory means;

a source of an output command signal coupled to said main memory;

means coupled to said main memory means and to said character bit number memory means for detecting a word-positioning code delivered from said main memory means upon receipt by said main memory of an output command signal, and for supplying the same to said character bit number memory means as a shift command so that character bit number-indicating signals are read out from said character bit number memory means one by one in said programmed order; and

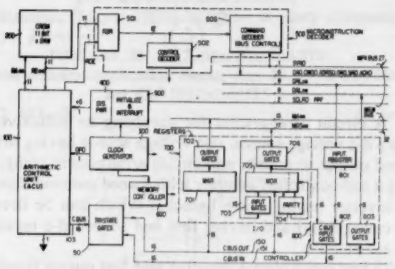
means coupled to said main memory means for determining the character bit number of each word being delivered from said character bit number memory means and to be transmitted to a printing apparatus, upon receipt of a character bit number-indicating signal read out from said character bit number memory means.

4,087,854

MINICOMPUTER SYSTEM WITH AN ARITHMETIC CONTROL UNIT INTEGRATED ON A ONE-CHIP SEMICONDUCTOR DEVICE

Tsuneo Kinoshita, Kokunbunji, and Kazuyuki Sato, Koganei, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Aug. 30, 1976, Ser. No. 719,052
Claims priority, application Japan, Sep. 4, 1975, 50/107261; Sep. 4, 1975, 50/107262; Sep. 4, 1975, 50/107263; Sep. 4, 1975, 50/107264; Sep. 4, 1975, 50/107265; Sep. 4, 1975, 50/107266; Sep. 4, 1975, 50/107267; Sep. 4, 1975, 50/107268; Sep. 4, 1975, 50/107268; Sep. 4, 1975, 50/107269; Sep. 4, 1975, 50/107270
Int. Cl.[2] G06F *7/48, 13/00*
U.S. Cl. 364—200 10 Claims



1. In a minicomputer system, a control storage for storing microinstructions, main memory means for storing macroinstructions and data, and an arithmetic control unit integrated on a one-chip semiconductor device and connected to the control storage and the main memory means, said arithmetic control unit comprising:

general registers designated by said macroinstructions and indirectly designated by said microinstructions,

working registers utilized by said microinstructions,

arithmetic and logic means for executing parallel add and subtract operations, logical operations, and shift operations in accordance with said microinstructions,

microinstruction fetch control means connected to the control storage for storing a next microinstruction address and one of said microinstructions to be executed,

a read only memory connected to the miroinstruction fetch control means and having a first means for storing addressed of specific microinstructions for phase control and for handling illegal instructions and initialization of said arithmetic control unit, and a second means for storing auxiliary instructions of said microinstructions,

a control decoder connected to the microinstruction fetch control means for decoding said microinstructions to enable functional operations of said arithmetic control unit,

macroinstruction fetch control means for storing a next macroinstruction address and one of said macroinstructions to be executed,

status control means for storing machine control information, and

an internal common bus connected to the general registers, working registers, arithmetic and logic means, microinstruction fetch control means, macroinstruction fetch control means and status control means for communication between units in said arithmetic control unit.

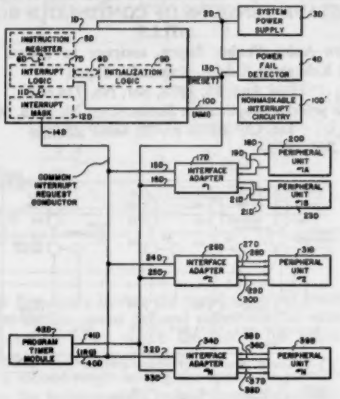
4,087,855
VALID MEMORY ADDRESS ENABLE SYSTEM FOR A MICROPROCESSOR SYSTEM

Thomas H. Bennett; Earl F. Carlow, both of Scottsdale; Edward C. Hepworth, Apache Junction, all of Ariz.; Wilbur L. Mathys, Norristown, Pa.; William D. Mensch, Jr., Norristown, Pa.; Rodney H. Orgill, Norristown, Pa.; Charles I. Peddle, Norristown, Pa., and Michael F. Wiles, Phoenix, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 519,149, Oct. 30, 1974. This application Sep. 17, 1975, Ser. No. 614,109

Int. Cl.[2] G06F *3/00, 13/00*

U.S. Cl. 364—200 **5 Claims**



1. A digital system comprising:

(a) a peripheral device;

(b) a data bus;

(c) an address bus for conducting binary signals;

(d) processor means coupled to said data bus and to said address bus for executing various instructions;

(e) memory means coupled to said data bus and to said address bus for storing data and storing said instructions, said memory means having a memory enable input;

(f) adaptor means coupled to said data bus, to said address bus, and to said peripheral device for transferring digital information between said peripheral device and said data bus, said adaptor means including an adaptor enable input; said processor means including

(1) address means coupled to said address bus for generating a binary address on said address bus;

(2) first means for producing an output signal indicative of whether said binary signals on said address bus represent a location being accessed by said processor means; and

(3) an output conductor for conducting said output signal; and

(g) circuit means having an input coupled to said output conductor and having an output coupled to said adaptor enable input of said adaptor means for generating an enable signal in response to said output signal to enable said adaptor means to be accessed by said processor means.

4,087,856
LOCATION DEPENDENCE FOR ASSURING THE SECURITY OF SYSTEM-CONTROL OPERATIONS

Clement Richard Attanasio, Peekskill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 30, 1976, Ser. No. 701,058

Int. Cl.[2] G06F *13/00*

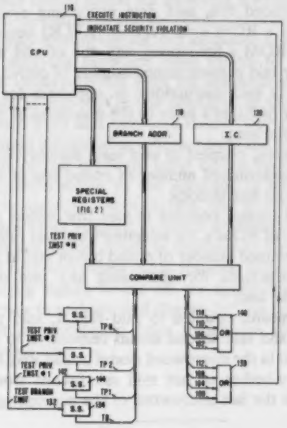
U.S. Cl. 364—200 **10 Claims**

1. A computer operating system security mechanism including a non-penetrable hardware storage means for storing special privileged instruction identification data for each privileged instruction which it is desired to protect,

means for loading said special identification data in said storage means and

said non-penetrable storage means being loadable only during the initial program load time of the system,

means for recognizing privileged instructions which are presented to the system for execution,



means for determining if a privileged instruction presented to the system for execution has proper identification data associated therewith, prior to execution of said privileged instruction, said last named means comprising comparison means for accessing said non-penetrable storage means associated with said privileged instruction and the identification data stored therein.

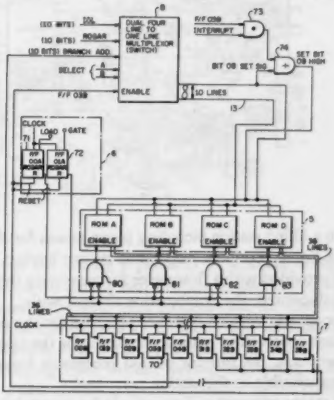
4,087,857
ROM-INITIALIZING APPARATUS

Thomas F. Joyce, Burlington, and Michel M. Raguin, Medford, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Oct. 4, 1976, Ser. No. 729,066

Int. Cl.[2] G06F *9/16*

U.S. Cl. 364—200 **7 Claims**



1. In a data processing system for sequentially executing instructions and having a main memory and a plurality of read only memories (ROM's), each ROM for storing a plurality of microprograms each microprogram comprised of a plurality of

microwords with each microword comprised of a plurality of bits, any of said microwords stored in said plurality of ROM's being addressed by a predetermined number of coded bits of at least one of said instructions stored in said main memory, any ROM of said plurality of ROM's being addressed by a first set of bits of said predetermined number of coded bits, any microword of said plurality of microwords within said any ROM being addressed by a second set of bits of said predetermined number of coded bits, said data processing system further comprised of a ROM-local register (RSLR) coupled to said plurality of ROM s for storing any one of said microwords addressed by said predetermined number of coded bits of said at least one of said instructions, an apparatus for initializing said plurality of ROM's prior to the execution of each microprogram comprising:

(a) first means, coupled to said main memory for decoding said predetermined number of coded bits of said at least one of said instructions;

(b) second means, coupled to said first means and to said plurality of ROM's, for selecting from said first means the predetermined number of coded bits of said at least one of said instructions for addressing any one of said microwords; and,

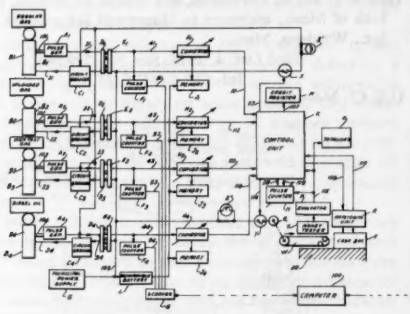
(c) third means, coupled to said RSLR, said plurality of ROM's and said second means responsive to a predetermined bit in the microword stored in said RSLR for determining whether or not said microword stored in said RSLR is the last microword of the microprogram.

4,087,858

ACCOUNTING AND CASH-TRANSFER SYSTEM FOR FILLING STATIONS HAVING METERED PUMPS

Peter Pichler, Steiermark, and Dietrich Ranner, Salzburg, both of Austria, assignors to Aral Austria Gesellschaft m.b.H., Vienna, Austria

Continuation-in-part of Ser. No. 732,395, Oct. 14, 1976, abandoned. This application Dec. 13, 1976, Ser. No. 749,753
Claims priority, application Austria, Oct. 14, 1975, 7837/75
Int. Cl.[2] B67D *5/08*; G06F *7/38*; G07F *7/04*
U.S. Cl. 364—465 **20 Claims**



1. In a filling station including pump means for the dispensation of liquid products, said pump means having at least one outlet provided with a flowmeter for measuring the quantity of liquid dispensed, the combination thereof with:

a receptacle with an entrance aperture for the deposition of cash received by station personnel for the sale of metered products, the interior of said receptacle being otherwise inaccessible to the station personnel;

test means adjacent said receptacle for ascertaining the value of money passed through said entrance aperture;

first signaling means coupled with said test means for generating signals representative of the amount of money deposited in said receptacle;

second signaling means coupled with said flowmeter for generating signals representative of the monetary value of the product dispensed;

arithmetic means connected to said first and second signaling means for registering a credit balance equal to an initial credit augmented by said amount of money and diminished by said monetary value; and

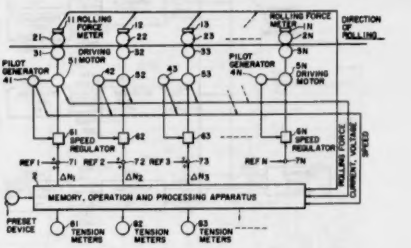
stop means connected by said arithmetic means for deactivating said pump means upon said credit balance dropping to a predetermined minimum.

4,087,859

APPARATUS FOR MEASURING AND CONTROLLING INTERSTAND TENSIONS OF CONTINUOUS ROLLING MILLS

Yoshiharu Anbe, Fuchu, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Aug. 16, 1976, Ser. No. 714,667
Claims priority, application Japan, Aug. 20, 1975, 50/100947
Int. Cl.[2] B21B *37/00*; G06F *15/46*
U.S. Cl. 364—472 **5 Claims**



1. Apparatus for measuring and controlling the interstand tension of a continuous rolling mill including a plurality of mill stands driven by individual motors, said apparatus comprising operation apparatus and preset apparatus for presetting a rolling program into said operation apparatus, said operation apparatus including means responsive to a preset value in said preset apparatus for determining a forward tension stress coefficient γ and a rearward tension stress coefficient δ in accordance with an equation

$$\gamma = \delta = A \cdot V/\omega \cdot K$$

where ωrepresents the angular speed of a rolling roll of said rolling mill, K a unit conversion coefficient, and A·V is mass flow of the rolled material.

4,087,860

SYSTEM FOR MULTI-MODE CONTROL OF A BOILER FEEDPUMP TURBINE

John M. Beatty, Prospect Park, and Robert L. Frater, Aston, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 8, 1977, Ser. No. 814,055
Int. Cl.[2] F01D *17/06*; G05B *11/06*
U.S. Cl. 364—494 **22 Claims**

1. A boiler feedpump turbine (BFPT) system for controlling the flow of feedwater pumped by a boiler feedpump from a feedwater source to a boiler comprising:

a source of steam;

a boiler feedpump turbine mechanically coupled to the boiler feedpump for governing the flow of feedwater pumped thereby as a function of the rotational speed of the turbine;

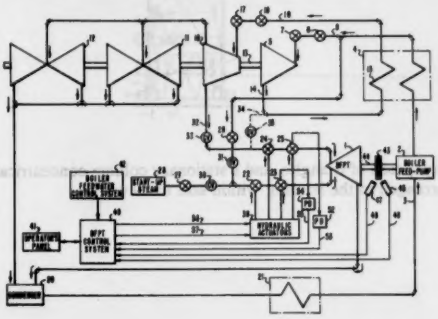
at least one steam admission valve for governing the steam admission to the boiler feedpump turbine from the source of steam to generate a rotational speed therein, said rota-

tional speed being a function of the position of the steam admission valve;

means for generating a boiler control turbine speed signal representative of the boiler control requirement for feedwater flow;

means for generating a turbine speed demand signal;

means for controlling the turbine speed in one of at least three modes by controlling the position of the at least one steam admission valve as a function of a speed set point, said at least three modes including:



(a) a first mode having the speed set point controlled by the turbine speed demand signal only at values of the speed set point which are below the boiler control turbine speed signal value;

(b) a second mode having the speed set point controlled by the boiler control turbine speed signal; and

(c) a third mode having the speed set point controlled by the turbine speed demand signal to override the boiler control turbine speed signal; and

means for automatically transferring between any two of the three modes without causing significant disturbance in the boiler feedpump feedwater flow.

4,087,861

CALCULATOR

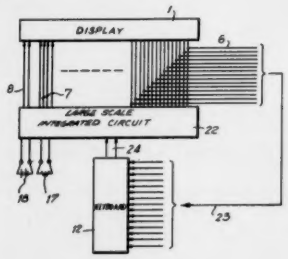
Yoshikiyo Futagawa, and Katsumi Kuriya, both of Shiojiri, Japan, assignors to Shinshu Seiki Kabushiki Kaisha, Suwa and Kabushiki Kaisha Suwa Seikosha, Tokyo, both of, Japan

Filed Dec. 10, 1976, Ser. No. 749,551

Claims priority, application Japan, Dec. 10, 1975, 50-146979

Int. Cl.[2] G06F 7/48, 15/02

U.S. Cl. 364—709 **8 Claims**



1. An electronic calculator comprising multi-digit display-cell means, each of said digits of display being defined, at least in part, by a plurality of segment electrodes and a passive display material, regions of said passive display material being rendered visible by selective application of driving signals to-selected of said segment electrodes; a large-scale integrated circuit means for producing said display-driving signals; a plurality of display-driving lines operatively coupling said large-scale integrated circuit means and said segment electrodes for transmitting said display-driving signals thereto; and keyboard means having a plurality of keys, an output operatively coupled between said plurality of keys and said large-scale integrated circuit means and a plurality of inputs, each corresponding to one of said keys and respectively connected to one of a corresponding selected plurality of said display-driving lines, said large-scale integrated circuit means including calculator circuit means for receiving information-bearing signals from the output of said keyboard means and for producing said display-driving signals, and keyboard-actuation circuit means for applying keyboard input signals to said selected plurality of display-driving lines for application to said keyboard means in response to the detection of the actuation of said keyboard from said keyboard means output, each of said keyboard input signals being different from the other, at least a selected one of said keyboard input signals being transmitted by said keyboard means by the actuation of one key of said keyboard through the output thereof, said keyboard-actuation circuit means being adapted to detect a display-driving signal at the keyboard means output in response to the initial actuation of said keyboard means and in response to detection of said display-driving signal, to cut off the application of display-driving signals to said selected display-driving lines during the period that said keyboard input signals are applied to said display-driving lines.

4,087,862

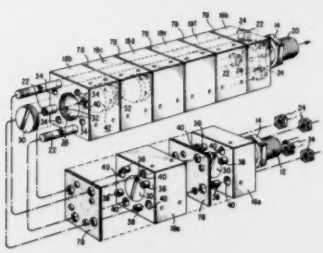
BLADELESS MIXER AND SYSTEM

Hsue C. Tsien, Livingston, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 639,825, Dec. 11, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,624

Int. Cl.[2] B01F 5/00, 5/06

U.S. Cl. 366—165 **34 Claims**



1. A device for mixing a plurality of streams, comprising: chamber means for mixing said streams, at least two circumferentially spaced peripheral inlet passageways for said chamber means at a first end thereof for directing said streams into said chamber means in a substantially tangential direction for creating a converging inlet vortex having increasing rotational velocity in a first direction in said chamber means comprising a mixture of said streams, and peripheral outlet passageway means at the opposite end of said chamber means for receiving and extracting said mixture of said streams from said chamber means as an outlet vortex having decreasing rotational velocity in a direction opposite to said first direction.

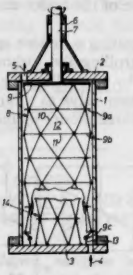
4,087,863

MIXER

Rüdolf Erdmenger, Bergisch-Gladbach, and Martin Ullrich, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 2, 1975, Ser. No. 564,393
Claims priority, application Germany, Apr. 23, 1974, 2419498
Int. Cl.[2] B01F 7/32
U.S. Cl. 366—305 8 Claims

1. A flow through mixer comprising a cylindrical housing having an inlet at one end and an outlet at the other end and a stirrer arranged concentrically within the housing, the stirrer comprising a drive pin which is arranged substantially axially in the housing and which, outside the housing, comprises means for connection to a drive, and, inside the housing, is connected to a supporting ring disposed perpendicular to the axis of rotation of the stirrer, the stirrer further comprising a plurality of rings disposed at intervals from one another perpendicular to the axis of rotation of the stirrer, and bars joining together adjacent rings so that each two adjacent bars and a ring section between them form a triangle and so that the stirrer is in the form of a substantially cylindrical framework



composed of triangles, and a stationary column concentrically arranged in the housing within said framework.

DESIGN PATENTS

GRANTED MAY 2, 1978

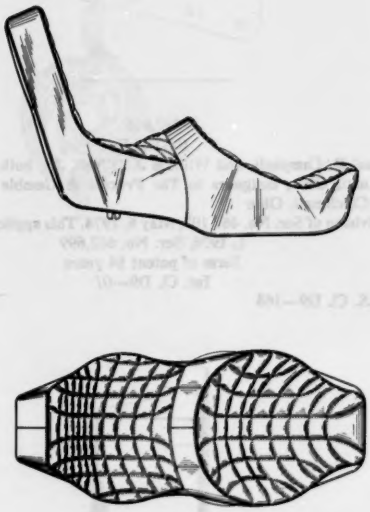
ERRATA

For CLASS	See PATENT NO.
D12–155	247,812

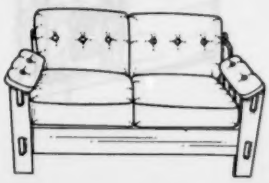
DESIGNS

MAY 2, 1978

247,796
MOTORCYCLE SEAT
Michael W. Hanagan, Somers, Conn., assignor to Corbin Gentry, Inc., Somersville, Conn.
Filed Oct. 26, 1976, Ser. No. 735,604
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D6—48.1

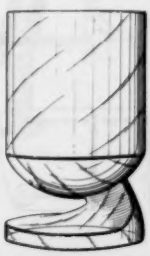


247,797
LOVESEAT
Lester Beall, Jr., High Point, N.C., assignor to Trend Line Furniture Corporation
Filed Sep. 25, 1975, Ser. No. 616,511
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

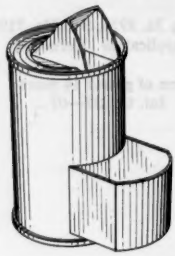


247,798
GOBLET OR SIMILAR ARTICLE
Ehrhard F. Holtorf, Saalburgring 43, D-6051 Dudenhofen, Germany
Filed Aug. 31, 1976, Ser. No. 719,479
Claims priority, application Germany, Apr. 26, 1976, 28142/76
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—13

247,799
GOBLET OR SIMILAR ARTICLE
Ehrhard F. Holtorf, Saalburgring 43, D-6051 Dudenhofen, Germany
Filed Aug. 31, 1976, Ser. No. 719,480
Claims priority, application Germany, May 5, 1976, 28143/76
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—13

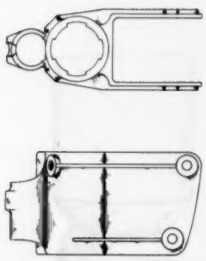


247,800
ICE CRUSHER
Foster Lisle Talge, Jr., Lake Quivira, and James Michael Gerdom, Overland Park, both of Kans., assignors to Dazey Products Co., Kansas City, Mo.
Filed Jul. 9, 1976, Ser. No. 703,747
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—156



247,801
PUSH MOUNT
John J. Bulanda, New Lenox, and Richard B. Wakely, Flossmoor, both of Ill., assignors to Panduit Corp.
Filed Sep. 7, 1976, Ser. No. 720,857
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—349

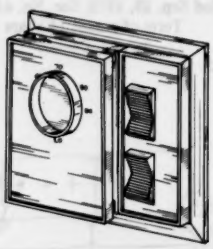
247,802
PULLEY BRACKET
William J. Meis, 6 Valley Dr., Crescent, Iowa 51526
Filed Nov. 26, 1976, Ser. No. 744,914
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—360



247,803
BRACKET FOR HOLDING JARS, CANS AND THE LIKE
Gary D. Hawk, 307 S. Buckeye, Iola, Kans. 66749
Filed Aug. 4, 1976, Ser. No. 711,513
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—373

247,804
BOTTLE
Paul R. Campbell, and William J. O'Neil, Jr., both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Division of Ser. No. 467,102, May 6, 1974. This application Mar. 1, 1976, Ser. No. 662,699
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—168

247,805
THERMOSTAT
Herbert J. Taylor, Aloha, Oreg., assignor to SunneControls Division Peco, Inc., Portland, Oreg.
Filed Apr. 12, 1976, Ser. No. 676,208
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—50



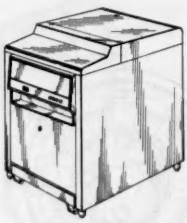
247,806
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,108
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—82

247,807
PENDANT OR SIMILAR ARTICLE
Elda Krecic, New York, N.Y., assignor to Monet Jewelers, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,081
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—83

247,808
VEHICLE WHEEL
Richard R. Woodward, Wrotham Heath, England, assignor to GKN Kent Alloys Limited, Rochester, England
Filed Dec. 11, 1975, Ser. No. 639,717
Claims priority, application United Kingdom, Jul. 16, 1975, 971845/75
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211

247,809
TOGGLE SWITCH BATON
Francis D. Kirchoff, Waban, Mass., assignor to Alco Electronic Products, Inc., North Andover, Mass.
Filed Jul. 12, 1976, Ser. No. 704,228
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—37

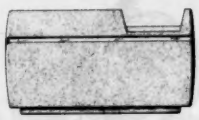
247,810
COMPUTER CENTRAL PROCESSING UNIT CABINET
Ernst Moeckl, Stuttgart, Germany, assignor to Nixdorf Computer A.G., Paderborn, Germany
Filed Aug. 18, 1976, Ser. No. 715,611
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—42

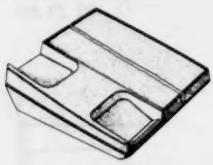


247,811
COMPUTER TERMINAL WORK STATION
Ernst Moeckl, Stuttgart, Germany, assignor to Nixdorf Computer A.G., Paderborn, Germany
Filed Aug. 18, 1976, Ser. No. 715,612
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—44

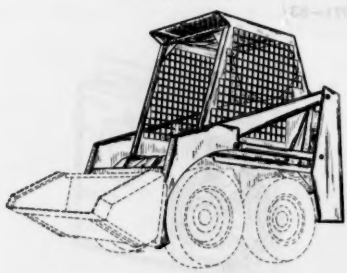
247,812
TRUCK CAB CADDY
Andre J. Olivan, 3970 Bayview Cir., Concord, Calif. 94520
Filed Apr. 28, 1976, Ser. No. 681,152
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155

247,813
TELEPHONE STAND
Donald Michael Genaro, Haworth, N.J.; John Niel McGarvey, Drexel Hill, Pa., and Gordon Elliot Sylvester, Jamaica, N.Y., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Continuation-in-part of Ser. No. 469,855, May 14, 1974, which is a continuation-in-part of Ser. No. 424,413, Dec. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 364,704, May 29, 1973, abandoned. This application Aug. 14, 1975, Ser. No. 604,592
The portion of the term of this patent subsequent to Nov. 4, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—60

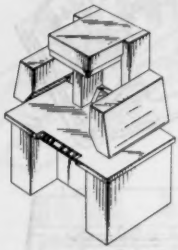




247,814
SKID STEER LOADER VEHICLE BODY
Logan W. Johnson, Minnetonka, and James L. Werner, Lamar, both of Mo., assignors to Clark Equipment Company, Buchanan, Mich.
Filed Feb. 2, 1976, Ser. No. 654,250
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—23

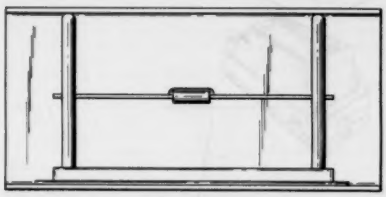


247,815
MICROFILM COPYING APPARATUS
Harry Arthur Hele Spence-Bate, 115 Cheam Place, Morley, Western Australia 6062, Australia
Filed Feb. 17, 1976, Ser. No. 658,656
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—30

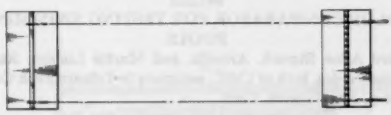


247,816
FRAME FOR EYEGLASSES
Michel Calamand, 23 des Burgondes 01100, Oyonnax Ain, France
Filed Mar. 23, 1976, Ser. No. 670,585
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

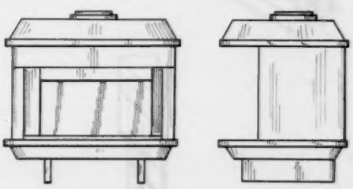
247,817
LOOSELEAF BINDER
Heinrich Hausmann, and Else Hausmann, both of Jestetten, Germany
Filed Aug. 20, 1976, Ser. No. 716,184
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—27



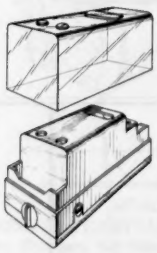
247,818
FISHING LEADER KEEPER ASSEMBLY
Donald G. Rayburn, 427 N. Reese Pl., Burbank, Calif. 91506
Filed Nov. 8, 1976, Ser. No. 739,479
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—99



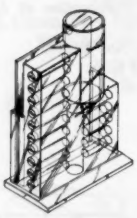
247,819
FREESTANDING FIREPLACE
Paul H. Lever, Failbrook, and Clifford D. Mohr, Rancho, both of Calif., assignors to Fireplace Corporation of America, Walled Lake, Mich.
Filed Jul. 26, 1976, Ser. No. 708,840
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97



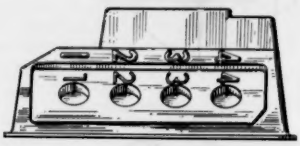
247,820
COMBINED ORAL JET CLEANSING HOUSING AND COVER THEREFOR
Franz Alban Stuetzer, Muehlheim, Main, Germany, assignor to Rowenta-Werke, GmbH, Offenbach am Main, Germany
Filed Apr. 14, 1977, Ser. No. 787,336
Claims priority, application Germany, Oct. 22, 1976, 9974
Term of patent 14 years
Int. Cl. D24—*03*
U.S. Cl. D24—15



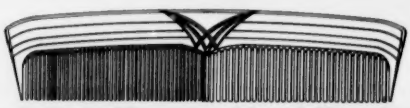
247,821
COLOR COMPARATOR FOR TESTING SWIMMING POOLS
Richard Allen Biersch, Arcadia, and Martin Liebert, Rancho Palos Verdes, both of Calif., assignors to Telautograph Corporation, Los Angeles, Calif.
Filed Jun. 15, 1976, Ser. No. 696,264
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—17



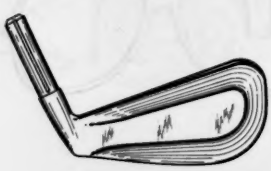
247,822
SUPPORT BASE AND HOLDER FOR USE IN LOADING ANTIGENIC MATERIALS ON A MULTI-APPLICATOR SKIN TESTING DEVICE
Gary L. Hein, Oakley, and Donald R. Mowen, Decatur, both of Ill., assignors to Lincoln Laboratories, Inc., Decatur, Ill.
Filed Mar. 29, 1976, Ser. No. 671,136
Term of patent 14 years
Int. Cl. D24—*02, 99*
U.S. Cl. D24—31



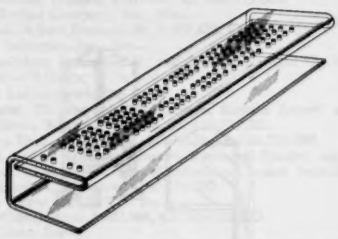
247,823
COMB
Anthony R. Romani, P.O. Box 1803, Altoona, Pa. 16603
Filed Jun. 3, 1976, Ser. No. 692,546
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—21



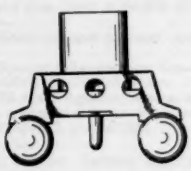
247,824
GOLF CLUB HEAD
Ivan Meissler, 18 Olympic Village, Apt. 1/C, Chicago Heights, Ill. 60411
Filed Sep. 3, 1976, Ser. No. 720,618
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH



247,825
CRIBBAGE BOARD
Alfred L. Christianson, 2820 Carriage La., Carrollton, Tex. 75006
Filed Oct. 26, 1976, Ser. No. 735,459
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 TT



247,826
TOY BOAT
Michael Anthony Mumford, Ailsworth, England, assignor to Miles Mumford Limited, Peterborough, England
Filed May 7, 1976, Ser. No. 684,369
Claims priority, application United Kingdom, Nov. 11, 1975, 973199/75
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 JJ



247,827
TOY MUSIC BOX
Shinroku Nakao, Yokahama; Yoshiyasu Ishii, and Taira Hanashima, both of Tokyo, all of Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Dec. 9, 1976, Ser. No. 749,135
Claims priority, application Japan, Jul. 29, 1976, 51-29705
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 C

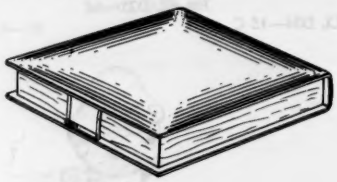
247,828
FRONT DISPLAY PANEL FOR VENDING MACHINES
Walter E. Moore, Bel-Nor, and Albert K. Grethey, Bridgeton, both of Mo., assignors to UMC Industries, Inc., Stamford, Conn.
Filed Jun. 28, 1976, Ser. No. 700,516
Term of patent 14 years
Int. Cl. D20—*01*
U.S. Cl. D52—3 R

247,829

COIN DISPLAY CASE

Edmund Schnitzer, Montreal, Canada, assignor to Renwick of Canada Inc., Montreal, Canada

Filed Mar. 15, 1976, Ser. No. 667,191
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—3 B

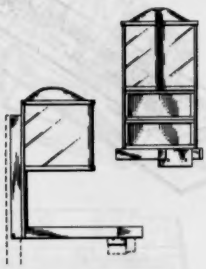


247,830

COMBINED MENU AND SERVING TRAY SUPPORT FOR A DRIVE-IN RESTAURANT

William B. Cunningham, Oklahoma City, Okla., assignor to Sonic Industries, Inc., Oklahoma City, Okla.

Filed Feb. 26, 1976, Ser. No. 661,584
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 2ND DAY OF MAY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Daidoseiko K.K.: *See*—
Kozuka, Goro; Matsui, Akira; Yoshida, Yoshiaki; Fujimoto, Katsuhiko; Okada, Shigeo; Nonoyama, Seiji; Kato, Yukihiko; and Hirose, Hideshi, 4,087,083, Cl. 266-273.000.

A. H. Robins Company, Inc.: *See*—
Cale, Albert Duncan, Jr., 4,087,428, Cl. 260-287.00F.

A.I.R. Industries, Inc.: *See*—
Hanrahan, James R., Jr.; and Levine, Richard G., 4,086,790, Cl. 66-178.00A.

Abbott Laboratories: *See*—
Perun, Thomas John; Rasmussen, Ronald Robert; and Horrom, Bruce Wayne, 4,087,528, Cl. 424-251.000.
Von Esch, Anne Mary, 4,087,522, Cl. 424-211.000.

Abbott, Robert William; Howard, Raymond Stanley; and Rose, John Arthur, to Imperial Chemical Industries Limited. Individual delivery of objects. 4,087,000, Cl. 198-454.000.

Abbott Screw & Mfg. Co.: *See*—
DeHaitre, Lon, 4,087,666, Cl. 200-158.000.

Abe, Kazuo: *See*—
Minami, Hidehiro; and Abe, Kazuo, 4,086,890, Cl. 123-119.0EC.

Abe, Mitsunobu: *See*—
Gondo, Hisashi; Abe, Mitsunobu; Usuda, Matsuo; Komiya, Kunihiko; and Kawano, Tsuyoshi, 4,087,289, Cl. 148-12.00R.

Abler, Norman C.: *See*—
Golladay, James D.; and Abler, Norman C., 4,086,789, Cl. 66-9.00B.

Abrahamsson, Kjell Evert: *See*—
Samuelson, Hans Olof; and Abrahamsson, Kjell Evert, 4,087,318, Cl. 162-60.000.

Acampora, Anthony, to Bell Telephone Laboratories, Incorporated. Decoder for implementing an approximation of the Viterbi algorithm using analog processing techniques. 4,087,787, Cl. 340-146.1AQ.

Accles and Shelvoke Limited: *See*—
Hancox, Roger John, 4,086,682, Cl. 17-1.00B.

ACF Industries, Inc.: *See*—
Hicks, Donald L.; and Doerr, Richard D., 4,086,896, Cl. 123-122.0AC.

Achelpohl, Fritz; and Tetenborg, Konrad, to Windmoller & Holscher. Method and apparatus for fully automatically filling sacks or bags made during filling from a web of tubular plastics film. 4,086,742, Cl. 53-29.000.

Adamek, David J., to Champion International Corporation. Package for stacked array. 4,087,003, Cl. 206-583.000.

Adams, Kenneth Douglas: *See*—
Ketterer, Stanley Joseph; and Adams, Kenneth Douglas, 4,086,861, Cl. 112-158.00E.

Adams, Ray. Soil anchor. 4,086,735, Cl. 52-160.000.

Adler, Edward. Process for producing metal-plastic laminate. 4,087,300, Cl. 156-184.000.

Aerodyne Research, Inc.: *See*—
Camac, Morton; and Bien, Fritz, 4,086,808, Cl. 73-655.000.

AGA Aktiebolag: *See*—
Agerskans, Jens Karl-Olof; and Agoston, Andras, 4,087,691, Cl. 250-347.000.

Agency of Industrial Science & Technology: *See*—
Kanae, Yoshioki, 4,087,746, Cl. 324-58.50A.

Agerskans, Jens Karl-Olof; and Agoston, Andras, to AGA Aktiebolag. Reference radiation source in a device for measuring the radiation from an object. 4,087,691, Cl. 250-347.000.

AGFA-Gevaert, A.G.: *See*—
Domges, Gunther; Scheller, Hartmut; and Zangenfeind, Helmut, 4,087,033, Cl. 225-1.000.
Pfeifer, Josef; Schnall, Gunther; Aldenhoven, Klaus; and Blochl, Hanns, 4,087,178, Cl. 355-72.000.
Wagensonner, Eduard, 4,087,830, Cl. 354-60.00L.

Agnew, George H.: *See*—
Braden, William B., Jr.; and Agnew, George H., 4,086,961, Cl. 166-245.000.

Agoston, Andras: *See*—
Agerskans, Jens Karl-Olof; and Agoston, Andras, 4,087,691, Cl. 250-347.000.

Aiba, Hiroaki; Matsui, Toshiie; and Yoshida, Shu, to Asahi Kasei Kogyo Kabushiki Kaisha. Process and apparatus for producing a photopolymer plate having relief images thereon. 4,087,182, Cl. 355-100.000.

Aiello, Gerald A.: *See*—
La Rosa, Richard; and Aiello, Gerald A., 4,087,714, Cl. 310-313.000.

Aileo, Jackson A.: *See*—
Frieder, Leonard P., Jr.; and Aileo, Jackson A., 4,087,653, Cl. 179-156.00R.

Air Products and Chemicals, Inc.: *See*—
Block, Charles S.; Chen, Michael S.; Noichl, Olaf J.; and Hong, Sun-Nan, 4,087,361, Cl. 210-199.000.

Airwick Pool Products, Inc.: *See*—
Sexton, Wilson B.; and Spencer, Frankie N., 4,087,286, Cl. 134-167.00R.

Aisan Kogyo Kabushiki Kaisha: *See*—
Onishi, Takanori; Kitahara, Osamu; Shimizu, Nobuo; Suzuki, Takio; Yamashirodani, Tetsuo; and Ohta, Yozo, 4,087,492, Cl. 261-41.00D.

Aisin Seiki Kabushiki Kaisha: *See*—
Hirosawa, Koichiro; Ogasahara, Tsunehiko; Ishikawa, Kazuo; and Murakami, Noboru, 4,086,994, Cl. 192-109.00F.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor switch device. 4,087,703, Cl. 307-253.000.

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Aktiebolaget Electrolux: *See*—
Forsberg, Per Erik Vilhelm, 4,086,782, Cl. 62-296.000.

Aktiebolaget Statens Skogsindustrier: *See*—
Berg, Rolf, 4,087,299, Cl. 156-192.000.

Aktiengesellschaft "Weser": *See*—
Nitzki, Leopold; and Alsen, Jurgen, 4,086,863, Cl. 114-61.000.

Aktieselskabet Brodrene Hartmann: *See*—
Moller, Bent, 4,087,042, Cl. 229-44.0EC.

Akzo N.V.: *See*—
Geerdes, Dirk J. F., 4,087,483, Cl. 260-879.000.

Akzona Incorporated: *See*—
Brandeau, Edward P.; and Gentry, John M., 4,086,697, Cl. 29-749.000.
Steenken, Gerhard E. W. K., 4,087,510, Cl. 423-53.000.

Albrecht, Hermann Friedrich, to Rollei-Werke Franke & Heidecke. Dual photographic slide projector. 4,087,167, Cl. 353-115.000.

Aldenhoven, Klaus: *See*—
Pfeifer, Josef; Schnall, Gunther; Aldenhoven, Klaus; and Blochl, Hanns, 4,087,178, Cl. 355-72.000.

Aldrich, Paul Harwood; and Dumas, David Howard, to Hercules Incorporated. Water-dispersible thermosettable cationic resins from reaction of (1) water soluble amino polyamide, (2) acid anhydride and (3) epihalohydrin. 4,087,395, Cl. 260-29.2EP.

Alexander, Jerry L.; and Pendergrass, Daniel B., Jr., to Minnesota Mining and Manufacturing Company. Plunger assembly. 4,087,181, Cl. 355-92.000.

Alford, Andrew. Asymmetrically fed antenna arrays. 4,087,824, Cl. 343-806.000.

Allegheny Ludlum Industries, Inc.: *See*—
Burk, David L., 4,086,731, Cl. 51-216.00R.

Allen-Bradley Company: *See*—
Kuhn, Edward H.; and Hart, John S., 4,087,770, Cl. 335-132.000.

Allen, Joseph A.; and Fuschetto, William R., to United States of America, Army. Receiver for detecting and analyzing amplitude or angle modulated waves in the presence of interference. 4,087,750, Cl. 325-363.000.

Aller, Harold E.; Kilbourn, Edward E.; Weiler, Ernest D.; and Weir, William D., to Rohm and Haas Company. Arthropodicidal and nematocidal phosphoramidates. 4,087,521, Cl. 424-211.000.

Alley, David W. Seal for repair of a shaft or the like and a method for doing same. 4,087,098, Cl. 277-9.000.

Allied Chemical Corporation: *See*—
Mares, Frank; and Largman, Theodore, 4,087,246, Cl. 8-115.500.
Ropp, Richard C., 4,087,511, Cl. 423-277.000.

Alps Electric Co., Ltd.: *See*—
Oka, Tsumoru, 4,087,779, Cl. 338-327.000.

Alsen, Jurgen: *See*—
Nitzki, Leopold; and Alsen, Jurgen, 4,086,863, Cl. 114-61.000.

Altman, Daniel E.: *See*—
Lewis, Adolph L.; Altman, Daniel E.; and Fear, Harold R., 4,087,158, Cl. 350-96.210.

Altman, Richard M., to Vivitar Corporation. Lens. 4,087,161, Cl. 350-217.000.

Aluminum Company of America: *See*—
Gorton, Philip S.; and Coleman, Ronald K., 4,086,747, Cl. 53-340.000.

Aluterv Aluminiumipari Tervezo Vallalat: *See*—
Mahig, Laszlo; Marton, Mihaly; and Steiner, Janos, 4,087,209, Cl. 417-268.000.

Amarantos, John G. Hydraulic powered bicycle. 4,087,105, Cl. 280-216.000.

Ambrose, John: *See*—
Elliott, Robert William; Ambrose, John; and Ettel, Victor Alexander, 4,087,339, Cl. 204-112.000.

Gendron, Aubrey Stewart; Ambrose, John; and Ettel, Victor Alexander, 4,087,338, Cl. 204-112.000.
Ambrus, Judith H.: *See—*
Bowers, Frederic M.; Ambrus, Judith H.; and DeGraba, Michael E., 4,087,591, Cl. 429-29.000.
American Colloid Company: *See—*
Clem, Arthur G., 4,087,365, Cl. 252-8.50A.
American Cyanamid Company: *See—*
Conrow, Ransom Brown; and Bernstein, Seymour, 4,087,613, Cl. 560-10.000.
Cross, Barrington; Grasso, Charles Paul; and Walworth, Bryant Leonidas, 4,087,612, Cl. 548-356.000.
Katz, Daniel Stanley, 4,087,364, Cl. 252-8.100.
Lenhard, Robert Herman; and Bernstein, Seymour, 4,087,548, Cl. 424-315.000.
Lovell, James Byron, 4,087,523, Cl. 424-218.000.
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Raghu, Sivaraman; Hoffmann, Arthur Kentaro; and Singh, Balwant, 4,087,611, Cl. 548-320.000.
Safir, Sidney Robert, 4,087,421, Cl. 260-243.300.
American Home Products Corporation: *See—*
Klaubert, Dieter H.; Sellstedt, John H.; and Guinosso, Charles J., 4,087,606, Cl. 544-163.000.
American Ionetics, Inc.: *See—*
Hancock, Bruce J., 4,087,722, Cl. 315-200.00A.
American Telecommunications Corporation: *See—*
Tucker, Council A., 4,087,650, Cl. 179-100.00D.
AMP Incorporated: *See—*
Hudson, William Jeffrey, Jr., 4,087,146, Cl. 339-17.00F.
Anbe, Yoshiharu, to Tokyo Shibaura Denki Kabushiki Kaisha. Apparatus for measuring and controlling interstand tensions of continuous rolling mills. 4,087,859, Cl. 364-472.000.
Anchor Hocking Corporation: *See—*
Aumack, Douglass D., 4,087,142, Cl. 312-236.000.
Anderson, Alfred T.: *See—*
Sanders, David E.; Anderson, Alfred T.; and Gordy, Robert S., 4,087,628, Cl. 178-88.000.
Anderson, John M., to General Electric Company. Transformer cascade for powering electronics on high voltage transmission lines. 4,087,701, Cl. 307-149.000.
Anderson, Roger Bruce; and Edwards, John Robert, to Beckman Instruments, Inc. Dual seal arrangement for a centrifuge rotor tube cavity. 4,087,043, Cl. 233-26.000.
Angioletti, Attilio; and Brollo, Aurelio, to Industrie Pirelli S.p.A. Extrusion head for the manufacture of handrails. 4,087,223, Cl. 425-112.000.
Anglo-American Clays Corporation: *See—*
Nott, Alan J.; and Price, William M., 4,087,004, Cl. 209-9.000.
ANIC S.p.A.: *See—*
Generini, Gianni, 4,087,276, Cl. 75-81.000.
Annett, Keith, to Foseco Trading A.G. Blocks of refractory concrete. 4,086,740, Cl. 52-511.000.
Annis, Myron C.: *See—*
Takahashi, Akio; Smith, Geoffrey H.; Rushton, Brian M.; and Annis, Myron C., 4,087,480, Cl. 260-847.000.
Anthony, Tad B.: *See—*
Kuyper, Herman S.; Anthony, Tad B.; and Evers, Robert S., 4,086,727, Cl. 49-255.000.
Anthony, Thomas R.: *See—*
Cline, Harvey E.; and Anthony, Thomas R., 4,087,239, Cl. 432-124.000.
Anthony's Manufacturing Company, Inc.: *See—*
Heaney, James J., 4,087,139, Cl. 312-138.00R.
Antos, George J., to UOP Inc. Dehydrocyclization with an acidic multimetallic catalytic composite. 4,087,352, Cl. 208-139.000.
Antos, George J., to UOP Inc. Acidic multimetallic catalytic composite. 4,087,381, Cl. 252-441.000.
Anzai, Nobuo; and Watanabe, Eiki, to Mitsubishi Denki Kabushiki Kaisha. Elevator control system. 4,086,983, Cl. 187-29.00R.
Aoi, Takahisa: *See—*
Atoji, Nobuhisa; and Aoi, Takahisa, 4,087,629, Cl. 179-1.00G.
Aoki, Shiro: *See—*
Kohira, Kazumaru; Aoki, Shiro; and Nagatani, Taizi, 4,087,674, Cl. 219-146.100.
Appleby, Paul E.: *See—*
Mangun, Clifford O.; Brinkley, Max D.; and Appleby, Paul E., 4,087,298, Cl. 156-136.000.
Touchette, John W.; and Appleby, Paul E., 4,087,305, Cl. 156-401.000.
Applegate, Lynn E.: *See—*
Jensen, James Henry; and Applegate, Lynn E., 4,087,388, Cl. 260-2.50M.
Aral Austria Gesellschaft m.b.H.: *See—*
Pichler, Peter; and Ranner, Dietrich, 4,087,858, Cl. 364-465.000.
Archer, Robert A.; and Lemberger, Louis, to Eli Lilly and Company. Hexahydro-dibenzo[b,d]pyran-9-ones as antiemetic drugs. 4,087,545, Cl. 424-283.000.
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Ardal og Sunndal Verk a.s.: *See—*
Sandvik, Eystein Edmund; and Stromme, Otto Johannes, 4,087,345, Cl. 204-243.00R.
ARi Industries, Inc.: *See—*
MacKenzie, Douglas J.; and Johnson, Dennis C., 4,087,775, Cl. 338-28.000.
Arkhipov, Vladimir Viktorovich: *See—*
Korenblit, Izya Yakovlevich; Kaplansky, Arkady Fridmanovich; Arkhipov, Vladimir Viktorovich; Frenkel, Andrei Filippovich; and Sarychev, Jury Pavlovich, 4,087,200, Cl. 415-199.200.
Arnquist, Willard Dale; and Roalsvig, Melvin John, to Boeing Company, The. Electrical control system for actuating inboard spoilers on aircraft. 4,087,065, Cl. 244-836.000.
Arruza, Antonio E., to Sugar Supply, Inc. Auxiliary seat assembly for sport fishing chair. 4,086,676, Cl. 9-7.000.
Asahi Glass Company, Ltd.: *See—*
Igarashi, Hitoshi; and Ekuan, Kenji, 4,086,857, Cl. 108-106.000.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Aiba, Hiroaki; Matsui, Toshiie; and Yoshida, Shu, 4,087,182, Cl. 355-100.000.
Asai, Minoru: *See—*
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Asakawa, Makoto: *See—*
Yamazaki, Shin-ichi; Asakawa, Makoto; and Saito, Tadao, 4,087,729, Cl. 318-601.000.
Asano, Isamu; Tamai, Mitsuru; Yuhara, Tadanori; and Yasuhara, Takeshi, to Fuji Electric Co., Ltd. Device for use in sensing pressures. 4,086,815, Cl. 73-721.000.
Asaro, Vincent. Locking mechanism for extension rods. 4,087,187, Cl. 403-104.000.
Asars, Juris A., to Westinghouse Electric Corp. Electro-optic display system. 4,087,792, Cl. 340-166.0EL.
Asawa, Charles K., to Hughes Aircraft Company. Boresighting system for infrared optical receiver and transmitter. 4,087,689, Cl. 250-342.000.
Asbeck, Adolf: *See—*
Heyden, Rudi; Asbeck, Adolf; and Eckelt, Michael, 4,087,398, Cl. 260-29.60R.
Ashland Oil, Inc.: *See—*
Shields, Theodore C., 4,087,256, Cl. 44-73.000.
Ashley, Albert H., to GTE Sylvania Incorporated. Cable equalization resonant amplifier circuit. 4,087,762, Cl. 330-304.000.
Ashton, Larry: *See—*
Block, Leo; and Ashton, Larry, 4,086,956, Cl. 165-38.000.
Atlas Copco Aktiebolag: *See—*
Johansson, Folke Ingvar, 4,086,984, Cl. 188-1.00B.
Atoji, Nobuhisa; and Aoi, Takahisa, to Matsushita Electric Industrial Co., Ltd. Binaural sound reproducing system with acoustic reverberation unit. 4,087,629, Cl. 179-1.00G.
Atsugi Kinzoku Kogyo Co., Ltd.: *See—*
Yamazaki, Noboru, 4,087,019, Cl. 220-258.000.
Atsugi Motor Parts, Co., Ltd.: *See—*
Hadama, Shigeyuki, 4,087,213, Cl. 417-454.000.
Atsumi, Katsuyoshi: *See—*
Toyota, Yoshiho; Sasaki, Singo; Atsumi, Katsuyoshi; and Nakagi, Akio, 4,087,479, Cl. 260-835.000.
Attanasio, Clement Richard, to International Business Machines Corporation. Location dependence for assuring the security of system-control operations. 4,087,856, Cl. 364-200.000.
Atwood, Glenn A.: *See—*
Thorn, Donald C.; and Atwood, Glenn A., 4,087,798, Cl. 340-237.00R.
Aucoin, Ano J., Jr.; and Hanks, Rodney. Fish handling apparatus. 4,086,717, Cl. 43-6.500.
Audesse, Emery G.: *See—*
Colville, William T.; Mecone, David W.; and Audesse, Emery G., 4,087,849, Cl. 362-13.000.
Aumack, Douglass D., to Anchor Hocking Corporation. Coupling means for food preparation apparatus. 4,087,142, Cl. 312-236.000.
Auracher, Franz; and Bell, Guido, to Siemens Aktiengesellschaft. Method for producing light conductor structures with interlying electrodes. 4,087,315, Cl. 156-656.000.
Austel, Volkhard: *See—*
Eberlein, Wolfgang; Kutter, Eberhard; Heider, Joachim; Austel, Volkhard; Kadatz, Rudolf; Diederen, Willi; Kobinger, Walter; Lillie, Christian; and Dammgen, Jurgen, 4,087,541, Cl. 424-274.000.
Austin, Harvey B., Jr., to Globe Ticket Company. Ticket issuing machine. 4,086,833, Cl. 83-205.000.
Autotronic Controls, Corp.: *See—*
Chapin, Leonard Lee, 4,087,491, Cl. 261-36.00A.
Avon Medicals Limited: *See—*
Steadman, Brian Lee, 4,087,301, Cl. 156-198.000.
AZO-Maschinenfabrik Adolf Zimmermann: *See—*
Jordan, Walter; and Konrath, Willi, 4,087,134, Cl. 302-53.000.
B. Denkikagakukogyo K.K.: *See—*
Kozuka, Goro; Matsui, Akira; Yoshida, Yoshiaki; Fujimoto, Katsuhiko; Okada, Shigeo; Nonoyama, Seiji; Kato, Yukihiko; and Hirose, Hideshi, 4,087,083, Cl. 266-273.000.
B. F. Goodrich Company, The: *See—*
Lee, Maw-Huei, 4,087,800, Cl. 340-259.000.
Badcock, Sidney C.; Dreissiger, Joseph L.; Holby, Brian J.; and Pardy, Ronald P., to Ford Motor Company. Steering column assemblies. 4,086,825, Cl. 74-492.000.
Bagwell, Marshall Underwood; and Barrett, Arnold Eugene, to Colonial Pipeline Company. Pipeline weld repair cap. 4,086,934, Cl. 137-322.000.
Bahker, Friedrich; and Kohler, Ernst Jurgen, to Siemens Aktiengesell-

schaft. Train protection and control system. 4,087,066, Cl. 246-167.00R.
Bahker, Friedrich; and Kohler, Ernst Jurgen, to Siemens Aktiengesellschaft. Train protection and control system. 4,087,067, Cl. 246-167.00R.
Baird, William C., Jr.; and Bearden, Roby, Jr., to Exxon Research & Engineering Co. Desulfurization and hydroconversion of residua with alkaline earth metal compounds and hydrogen. 4,087,348, Cl. 208-108.000.
Baird, William C., Jr., to Exxon Research & Engineering Co. Hydroconversion and desulfurization process. 4,087,349, Cl. 208-108.000.
Bakal, Abraham I.; Witzel, Frank; Mackay, Donald A. M.; and Schoenholz, Daniel, to Life Savers, Inc. Long-lasting flavored chewing gum including sweetener dispersed in ester gums and method. 4,087,557, Cl. 426-3.000.
Bakay, Larry. Traffic board game. 4,087,094, Cl. 273-254.000.
Baker, Don R.; and Walker, Francis H., to Stauffer Chemical Company. N-(1,1-substituted acetonitrilo)-α-(3,5-substituted phenoxy) alkyl amides and their use as herbicides. 4,087,277, Cl. 71-105.000.
Balaban, Stephen M.; and Cox, Raymond C., Jr., to Monsanto Company. Production of chloro-s-triazine triones. 4,087,608, Cl. 544-190.000.
Ball, Newton E.: *See*—
Burks, Nathaniel W.; Ball, Newton E.; and Britt, David L., 4,086,917, Cl. 128-2.05T.
Ball, Richard Harding. Aircraft instrument. 4,086,810, Cl. 73-179.000.
Balluff, Robert N., to Tenneco Inc. Method of making catalytic converters for exhaust gases. 4,087,039, Cl. 228-173.00R.
Bambara, John D.; and Knaus, Dennis, to Packaging Industries, Inc. Shipping bag. 4,087,002, Cl. 206-523.000.
Banker, John G.: *See*—
Holcombe, Cressie E., Jr.; Swain, Ronald L.; Banker, John G.; and Edwards, Charlene C., 4,087,573, Cl. 427-372.00R.
Barnard, Walter C.; and Dahlstrom, Kenneth J., to Whirlpool Corporation. Ice maker cabinet door construction. 4,087,143, Cl. 312-138.00R.
Barnes, John A., to Ritter Corporation. High power variable pulse width triggering circuits. 4,087,705, Cl. 307-265.000.
Barnett, Gabriel; Gershaw, Nathan; and Mausner, Jack J., to Helena Rubinstein, Inc. Skin cream containing milk protein. 4,087,555, Cl. 424-357.000.
Baron, Gerhard; Bierbach, Herbert; and Hafke, Carl, to Metallgesellschaft Aktiengesellschaft. Process for purifying raw gas from the gasification of solid fuels. 4,087,258, Cl. 48-197.00R.
Barrett, Arnold Eugene: *See*—
Bagwell, Marshall Underwood; and Barrett, Arnold Eugene, 4,086,934, Cl. 137-322.000.
Barrett, George M. Combined internal combustion and heat engine. 4,086,771, Cl. 60-616.000.
Barrett, James H.; and Clemens, David H., to Rohm and Haas Company. Desalination process using thermally regenerable resins. 4,087,357, Cl. 210-32.000.
Barrett, Stewart P., Jr.: *See*—
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Barszczewski, Andrzej; and Hardwick, Charles D., to Canadian Patents & Development Limited. VLF radio position location system. 4,087,816, Cl. 343-105.00R.
Barthe, Marie-Pierre: *See*—
Goutte, Rene; Battigelli, Jean A.; and Barthe, Marie-Pierre, 4,087,267, Cl. 65-5.000.
BASF Aktiengesellschaft: *See*—
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Mietzner, Franz Georg; Buechner, Oskar; Steigerwald, Klaus; Schlichthaerle, Gottfried; and Urban, Friedrich, 4,087,602, Cl. 528-481.000.
Pfleger, Klaus; Zacher, Wieland; Boettcher, Klaus; Skorczyk, Ronald; Buechner, Oskar; and Mietzner, Franz Georg, 4,087,601, Cl. 526-329.000.
Bates, Kenneth Clayton. Rotary prime mover and compressor and methods of operation thereof. 4,086,880, Cl. 123-205.000.
Battigelli, Jean A.: *See*—
Goutte, Rene; Battigelli, Jean A.; and Barthe, Marie-Pierre, 4,087,267, Cl. 65-5.000.
Battisti, Angelo J., to GAF Corporation. Composition for hardening photographic hydrophilic binder and photographic element containing the same. 4,087,283, Cl. 96-111.000.
Bauer, Hans F.: *See*—
Robinson, Leon; and Bauer, Hans F., 4,087,514, Cl. 423-461.000.
Bauerle, Gerhard, to Bunker Ramo Corporation. Electrical connector with zero insertion force. 4,087,148, Cl. 339-75.0MP.
Baugher, Robert Charles; Bond, Robert Henry; Immel, Walter William, Sr.; and Kiemer, Ralph Frederick, to Steelastic Company, The. Apparatus and method for making reinforced elastomeric fabric. 4,087,308, Cl. 156-405.00R.
Baumgartner, Franklin W.: *See*—
Myers, John E., 4,087,698, Cl. 307-84.000.
Baxter, Clyde Edward; and Gurgiolo, Arthur Emilio, to Dow Chemical Company, The. Solvent extraction of aromatic hydrocarbons. 4,087,355, Cl. 208-330.000.
Baxter Travenol Laboratories, Inc.: *See*—
Lamadrid, Rene G., 4,087,185, Cl. 356-201.000.
Bayer Aktiengesellschaft: *See*—
Erdmenger, Rudolf; and Ullrich, Martin, 4,087,863, Cl. 366-305.000.
Knofel, Hartmut; and Ellendt, Gunther, 4,087,459, Cl. 260-570.00D.
Kramer, Erich; and Bleck, Wolf Eckhard, 4,087,245, Cl. 8-85.00A.
Nakamura, Michihiro; Fujiwara, Yuzuru; and Yasui, Teruo, 4,087,622, Cl. 560-245.000.
Pauli, Otto; Genth, Hermann; and Wolz, Hermann, 4,087,543, Cl. 424-301.000.
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Prescher, Gunter; Schreyer, Gerd; Waldmann, Helmut; and Schwerdtel, Wulf, 4,087,455, Cl. 260-502.00R.
Psaar, Hubertus, 4,087,241, Cl. 8-2.50A.
Reese, Eckart; and Wank, Joachim, 4,087,578, Cl. 428-216.000.
Reinehr, Ulrich; Braun, Hans-Dieter; and Dippelhofer, Robert, 4,087,494, Cl. 264-78.000.
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert R., 4,087,272, Cl. 71-120.000.
Bayerische Motoren Werke Aktiengesellschaft: *See*—
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Bayonnet, Jack L., to Goodyear Tire & Rubber Company, The. Method for controlling uniformity in tire tread stock. 4,087,499, Cl. 264-40.700.
BBC Brown, Boveri & Company Limited: *See*—
Bernasconi, Felix, 4,086,690, Cl. 29-156.80R.
Gaiffi, Sevi; Menth, Anton; and Nagel, Hartmut, 4,087,291, Cl. 148-31.570.
Bean, Gerald T., to United States of America, Army. Temperature control device. 4,087,687, Cl. 250-331.000.
Beard, Robert M., to Compagnie Francaise Des Petroles. Lock means for a tension line. 4,086,776, Cl. 61-69.00R.
Bearden, Roby, Jr.: *See*—
Baird, William C., Jr.; and Bearden, Roby, Jr., 4,087,348, Cl. 208-108.000.
Beatrice Foods Co.: *See*—
Hellwig, Oskar Alexander, 4,086,796, Cl. 70-456.00B.
Beatty, John M.; and Frater, Robert L., to Westinghouse Electric Corp. System for multi-mode control of a boiler feedpump turbine. 4,087,860, Cl. 364-494.000.
Beausoleil, William F.; Hennet, Peter P.; Maling, Klim; and Powers, Norman K., to International Business Machines Corporation. Multilevel storage hierarchy emulation monitor. 4,087,794, Cl. 364-900.000.
Becker, Hans-Werner; and Oberlander, Werner, to Maschinenfabrik Becker & Co. Kg. Method of and apparatus for compacting scrap. 4,086,850, Cl. 100-42.000.
Becker, Klaus: *See*—
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Beckman Instruments, Inc.: *See*—
Anderson, Roger Bruce; and Edwards, John Robert, 4,087,043, Cl. 233-26.000.
Beene, Gerald Wayne; and Cates, Robert P., to Reliance Telecommunication Electronics Company. Amplitude modulated telephone carrier systems. 4,087,639, Cl. 179-2.50R.
Beery, Jack, to Burroughs Corporation. Document photography system. 4,087,173, Cl. 355-24.000.
Beery, Jack, to Burroughs Corporation. Magnetic ink character recognition system. 4,087,789, Cl. 340-146.30C.
Beggs, Donald, to Midrex Corporation. Method for direct reduction of sulfur-containing iron ore. 4,087,275, Cl. 75-35.000.
Begin, Louis E.: *See*—
Dunbar, Joseph E.; and Begin, Louis E., 4,087,605, Cl. 544-114.000.
Beinbrech, Richard E., to Murfin Incorporated. Method of making medallion-like articles and lenses. 4,087,570, Cl. 427-44.000.
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Bell & Howell Company: *See*—
DeFoe, Douglas Nelson, 4,087,836, Cl. 358-44.000.
Johnson, Delmar R., 4,087,175, Cl. 355-40.000.
Pasturczak, Vincent S.; and Mischenko, Peter S., 4,087,165, Cl. 352-157.000.
Bell Telephone Laboratories, Incorporated: *See*—
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Blum, Frederick David; Hester, Donald Larry; and Peoples, John Terrance, 4,087,656, Cl. 179-175.30R.
Brolin, Stephen Joseph; Lisco, Richard Joseph; and Manfred, Mark Thomas, 4,087,646, Cl. 179-18.0FA.
De Gennaro, Cosmo Henry, 4,087,737, Cl. 323-108.000.
Embree, Milton Luther; and O'Neill, John Francis, 4,087,647, Cl. 179-77.000.
Fitzwilliam, James William, 4,087,633, Cl. 179-1.00P.
Hafer, Edward Henry, 4,087,632, Cl. 179-1.0SD.
Hoppough, Richard Scott, 4,087,658, Cl. 179-175.30R.
Kubik, Peter Steve, 4,087,150, Cl. 339-97.00P.
Lescinsky, Frank William; and Tammaru, Tarmo, 4,087,786, Cl. 340-146.1AB.
Mueller, Kurt Huggo, 4,087,654, Cl. 179-170.200.
Peoples, John Terrance, 4,087,657, Cl. 179-175.30R.
Beloit Corporation: *See*—
Linkletter, Merle G., 4,087,319, Cl. 162-113.000.
Bendix Corporation, The: *See*—
Kytta, Oswald Oscar, 4,086,842, Cl. 91-369.00A.
Sawicki, Joseph J.; Yates, Lester R.; and Shepherd, Reeves T., 4,087,817, Cl. 343-117.00R.
Bendoni, Leonard V., to Polaroid Corporation. Bearing block mount

for a photographic fluid spreading apparatus. 4,087,831, Cl. 354-304.000.
Bennett, John E., to Diamond Shamrock Corporation. Rejuvenation of the efficiency of sea water electrolysis cells by periodic removal of anodic deposits. 4,087,337, Cl. 204-95.000.
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., to Motorola, Inc. Valid memory address enable system for a microprocessor system. 4,087,855, Cl. 364-200.000.
Benson Equipment Co., Inc.: *See*—
Benson, Ernest J., 4,087,265, Cl. 62-63.000.
Benson, Ernest J., to Benson Equipment Co., Inc. Apparatus and method for chilling seafood products. 4,087,265, Cl. 62-63.000.
Beran, Miroslav: *See*—
Hudecek, Slavko; Gavrilova, Ivana; Beran, Miroslav; and Juracka, Frantisek, 4,087,396, Cl. 260-29.60H.
Berg, Rolf, to Aktiebolaget Statens Skogsindustrier. Method and apparatus for manufacturing cylindrical tubes. 4,087,299, Cl. 156-192.000.
Bergomi, Angelo: *See*—
Tazuma, James J.; and Bergomi, Angelo, 4,087,477, Cl. 260-681.50R.
Bergson, Gustav. Switch enclosure for hazardous environment having cover removal interlocking defeater assembly. 4,087,661, Cl. 200-50.00R.
Bernasconi, Felix, to BBC Brown, Boveri & Company Limited. Method and apparatus for producing a rotor welded together from discs. 4,086,690, Cl. 29-156.80R.
Bernecker, Gunther, to Conlin, Donald B., a part interest. Carburetor. 4,086,893, Cl. 123-122.00E.
Berney, Carl L.: *See*—
Browning, Iben; Berney, Carl L.; Chapman, Robert G., Jr.; Glaser, George; Madden, John D.; and Postas, L. John, 4,087,630, Cl. 179-1.0SD.
Bernstein, Jack: *See*—
Hoehn, Hans; Bernstein, Jack; and Vogt, Berthold Richard, 4,087,433, Cl. 260-296.00P.
Bernstein, Seymour: *See*—
Conrow, Ransom Brown; and Bernstein, Seymour, 4,087,613, Cl. 560-10.000.
Lenhard, Robert Herman; and Bernstein, Seymour, 4,087,548, Cl. 424-315.000.
Besenmatter, Walter; Muszumanski, Trude; and Wendisch, Irmgard, to Vockenhuber, Karl; and Hauser, Raimund. Camera objective of variable focal length. 4,087,160, Cl. 350-184.000.
Bessen, Irwin I., to General Electric Company. Coated article. 4,087,589, Cl. 428-596.000.
Bessett, Clifford H.; Boyd, James W.; and Misdom, Theodore H., Jr., to Packaging Corporation of America. Molded container for fragile articles. 4,087,040, Cl. 229-2.5EC.
Beuchat, Roger, to Mefina S.A. Information transmitting system. 4,087,774, Cl. 336-73.000.
Bezdek, Milan: *See*—
Hrabak, Frantisek; Bezdek, Milan; Bouchal, Karel; and Lokaj, Jan, 4,087,600, Cl. 526-292.000.
Bharucha, Kekhusroo R.; and Coleman, Michael H., to Canada Packers Limited; and Unilever Limited. Control of nitrosamine formation in nitride cured meat with 1,2,3,4-tetrahydro-quinoline compounds. 4,087,561, Cl. 426-266.000.
Bichara, Kamal F. Liquid crystal film. 4,087,575, Cl. 428-1.000.
Bick, Rodger L.; and Fekete, Lajos F., to Wilson, William L.; Bick, Rodger L.; and Fekete, Lajos F. Antithrombin III. 4,087,415, Cl. 260-112.00B.
Bicking, John B.: *See*—
Cragoe, Edward J., Jr.; Jones, James H.; and Bicking, John B., 4,087,435, Cl. 260-301.000.
Bien, Fritz: *See*—
Camac, Morton; and Bien, Fritz, 4,086,808, Cl. 73-655.000.
Bierbach, Herbert: *See*—
Baron, Gerhard; Bierbach, Herbert; and Hafke, Carl, 4,087,258, Cl. 48-197.00R.
Binder, Georg, to Robert Bosch GmbH. Slip-ringless claw-pole dynamo electric machine, particularly automotive-type alternator. 4,087,713, Cl. 310-266.000.
Binder, Klaus: *See*—
Eisele, Erwin; Binder, Klaus; and Drexl, Klaus, 4,086,878, Cl. 123-1.00A.
Bindra, Jasjit S.; and Johnson, Michael R., to Pfizer Inc. Substituted ω-pentanorprostaglandins. 4,087,604, Cl. 542-426.000.
Biomarine Handelsgesellschaft AG.: *See*—
Hafeli, Robert, 4,087,597, Cl. 526-5.000.
Biotest-Serum-Institut GmbH: *See*—
Rosemeyer, Friedrich; Walker, Wolfram Hubert; Ganshirt, Karl-Heinz; and Wendt, Heinz, 4,087,363, Cl. 210-315.000.
Biphase Engines, Inc.: *See*—
Hays, Lance G., 4,087,261, Cl. 55-41.000.
BKM Company, The: *See*—
Moses, Brian Keith, 4,086,726, Cl. 49-37.000.
Blake, William J.: *See*—
Swanson, Robert L.; and Blake, William J., 4,086,718, Cl. 43-17.200.
Blazevic, Nikola: *See*—
Kajfez, Franjo; Blazevic, Nikola; and Sunjic, Vitomir, 4,087,614, Cl. 560-27.000.
Bleck, Wolf Eckhard: *See*—
Kramer, Erich; and Bleck, Wolf Eckhard, 4,087,245, Cl. 8-85.00A.
Blenkinsop, Paul Addyman: *See*—
Neal, Donald Francis; and Blenkinsop, Paul Addyman, 4,087,292, Cl. 148-32.500.
Bloch, Alan: *See*—
Joslow, David L.; Bloch, Alan; Henthorn, Lincoln; and Straube, Harold M., 4,087,643, Cl. 179-15.0AL.
Blochl, Hanns: *See*—
Pfeifer, Josef; Schnall, Gunther; Aldenhoven, Klaus; and Blochl, Hanns, 4,087,178, Cl. 355-72.000.
Block, Charles S.; Chen, Michael S.; Noichl, Olaf J.; and Hong, Sun-Nan, to Air Products and Chemicals, Inc. Activated sludge system with staggered partition basin. 4,087,361, Cl. 210-199.000.
Block, Leo; and Ashton, Larry, to Raypak, Incorporated. Temperature control of heat exchanger with bypass. 4,086,956, Cl. 165-38.000.
Blonigen, Quentin P. Multiple rating device. 4,086,715, Cl. 40-504.000.
Bloomfield, Jordan J., to Monsanto Company. Method of simultaneously carrying out plurality of photochemical reactions. 4,087,342, Cl. 204-157.10R.
Blount, David H. Process for the production of epoxy silicate foam. 4,087,407, Cl. 260-465.00R.
Bloxwich Lock and Stamping Company Limited, The: *See*—
Shaw, Leslie Ralph; and Morris, Barry Stanley, 4,087,122, Cl. 292-218.000.
Blum, Frederick David; Hester, Donald Larry; and Peoples, John Terrance, to Bell Telephone Laboratories, Incorporated. Testing of inductively loaded transmission lines for correct loading. 4,087,656, Cl. 179-175.30R.
Blutreich, Joachim N., to National Mine Service Company. Charging circuit for combination trolley and battery powered locomotives. 4,087,734, Cl. 320-28.000.
Bochan, John, to General Electric Company. Clothes dryer machine and method. 4,086,707, Cl. 34-48.000.
Bochmann, Carl E.: *See*—
Riley, Michael W.; Duncan, Lane S.; and Bochmann, Carl E., 4,086,987, Cl. 192-58.00B.
Bode, Kurt; and Vehrke, Heinz, to Rollei-Werke Franke & Heidecke. Motion picture camera. 4,087,164, Cl. 352-141.000.
Boehringer Ingelheim GmbH: *See*—
Eberlein, Wolfgang; Kutter, Eberhard; Heider, Joachim; Austel, Volkhard; Kadatz, Rudolf; Diederen, Willi; Kobinger, Walter; Lillie, Christian; and Dammgen, Jurgen, 4,087,541, Cl. 424-274.000.
Langbein, Adolf; Walther, Gerhard; Danneberg, Peter; and Kuhn, Franz Josef, 4,087,531, Cl. 424-267.000.
Merz, Herbert; Langbein, Adolf; Walther, Gerhard; and Stockhaus, Klaus, 4,087,532, Cl. 424-267.000.
Boehringer Mannheim GmbH: *See*—
Braun, Franz; Stach, Kurt, deceased; Plattner, Werner, executor; Thiel, Max; Sponer, Gisbert; and Dietmann, Karl, 4,087,520, Cl. 424-177.000.
Boeing Company, The: *See*—
Arnquist, Willard Dale; and Roalsvig, Melvin John, 4,087,065, Cl. 244-836.000.
Redshaw, Charles Gordon, 4,087,123, Cl. 292-341.190.
Schaut, Larry Allen; and Zimbrick, Richard Alan, 4,086,761, Cl. 60-226.00R.
Boenecke, Charles A. Tamperproof handset for railroad applications. 4,087,659, Cl. 179-186.000.
Boettcher, Klaus: *See*—
Pfleger, Klaus; Zacher, Wieland; Boettcher, Klaus; Skorczyk, Ronald; Buechner, Oskar; and Mietzner, Franz Georg, 4,087,601, Cl. 526-329.000.
Boggs, Roger L.; and Sogge, John W., to Caterpillar Tractor Co. Track-type vehicle wheel having controlled impact resistance. 4,087,136, Cl. 305-57.000.
Bohl, Alfred W.: *See*—
Kosrow, Robert L.; and Bohl, Alfred W., 4,086,860, Cl. 112-153.000.
Boliden Aktiebolag: *See*—
Edenwall, Ingvar A. O.; Ekman, Douglas Sewerin; Elvander, Hans I.; Gorling, Karl Goran; Hellestam, Carl Johan Sigvard; and Melkersson, Karl-Axel, 4,087,274, Cl. 75-10.00R.
Bond, Robert Henry: *See*—
Baugher, Robert Charles; Bond, Robert Henry; Immel, Walter William, Sr.; and Kiemer, Ralph Frederick, 4,087,308, Cl. 156-405.00R.
Bonsall, George, to Brodart, Inc. Library late-book fine computer. 4,087,678, Cl. 235-86.000.
Boots Company Limited, The: *See*—
Brookes, Robert Frederick; Godson, David Henry; Greenwood, Douglas; Tulley, Margaret; and Wakerley, Stanley Brice, 4,087,269, Cl. 71-92.000.
Borg-Warner Corporation: *See*—
Gatewood, Sidney Ulane, 4,086,996, Cl. 192-111.00A.
Spokas, Romas B., 4,086,995, Cl. 192-111.00B.
Borrello, Giuseppe, to Colgate-Palmolive Company. Water-soluble enzyme granules. 4,087,368, Cl. 252-89.00R.
Borucki, Eugene W.; and Zaloga, Peter P., to Zaloga, Peter P. Test apparatus. 4,087,046, Cl. 236-11.000.
Bosch-Siemens Hausgerate GmbH: *See*—
Dienemann, Wolfgang, 4,086,780, Cl. 62-174.000.
Bossens, Jacky; and Lacourieux, Jean Louis, to Commissariat a l'Energie Atomique. Sealing device for the emergent shaft end of a rotating machine. 4,087,097, Cl. 277-3.000.

Bouchal, Karel: *See*—
Hrabak, Frantisek; Bezdek, Milan; Bouchal, Karel; and Lokaj, Jan, 4,087,600, Cl. 526-292.000.

Bouillon, Claude; and Vayssie, Charles, to L'Oreal. Hydroxylated amine thioethers for improving the greasy and unaesthetic appearance of the hair and skin. 4,087,550, Cl. 424-319.000.

Bourguet, Alain P.; and Gantois, Philippe L., to Jeumont-Schneider. Constant-frequency current choppers for low-rate supply of an inductive load. 4,087,726, Cl. 318-345.00G.

Bowers, Frederic M.; Ambrus, Judith H.; and DeGraba, Michael E., to United States of America, Navy. Pyrotechnically activated lithium-chlorine cell having a lithium vapor barrier. 4,087,591, Cl. 429-29.000.

Bowie, Raymond Alexander; Cox, John Michael; Farrell, Gordon Michael; and Shephard, Margaret Claire, to Imperial Chemical Industries Limited. Pesticidal dihydrotetrazolo[1,5-a]quinazolines. 4,087,422, Cl. 544-251.000.

Bowman, William G.; and Stadig, William P., to Petro-Tex Chemical Corporation. Fixed bed process for the production of *t*-butanol. 4,087,471, Cl. 568-899.000.

Boyd, James W.: *See*—
Bessett, Clifford H.; Boyd, James W.; and Misdom, Theodore H., Jr., 4,087,040, Cl. 229-2.5EC.

BP Chemicals Limited: *See*—
Hyde, David Leslie; and Kirkwood, Kenneth Clark, 4,087,380, Cl. 252-429.00B.

Brace, John F. G.; Dreissiger, Joseph L.; and Earle, Anthony N. C., to Ford Motor Company. Motor vehicle rear suspension system. 4,087,117, Cl. 280-724.000.

Bracha, Peretz: *See*—
Ovadia, David; Peleg, Nitzah; and Bracha, Peretz, 4,087,534, Cl. 424-269.000.

Braden, William B., Jr.; and Agnew, George H., to Texaco Inc.; and Texaco Exploration Canada Ltd. Method of oil recovery employing enriched gas drive with control of evolved gas. 4,086,961, Cl. 166-245.000.

Brader, Roy Henry, to RCA Corporation. Scrambler and unscrambler for serial data. 4,087,626, Cl. 178-22.000.

Brady, John F.; and Pyle, Lawrence F., to Felt Products Mfg. Co. Large motion expansion joint. 4,087,191, Cl. 404-69.000.

Brandeau, Edward P.; and Gentry, John M., to Akzona Incorporated. Apparatus for making wire termination assemblies. 4,086,697, Cl. 29-749.000.

Brandell, John R., to Brandell Products Corporation. Golf ball markers. 4,086,851, Cl. 101-4.000.

Brandell Products Corporation: *See*—
Brandell, John R., 4,086,851, Cl. 101-4.000.

Braun, Franz; Stach, Kurt, deceased; by Plattner, Werner, executor; Thiel, Max; Sponer, Gisbert; and Dietmann, Karl, to Boehringer Mannheim GmbH. Lowering blood pressure with new L-3-(3,4-dihydroxyphenyl)-2-methyl-alanine peptides. 4,087,520, Cl. 424-177.000.

Braun, Hans-Dieter: *See*—
Reinehr, Ulrich; Braun, Hans-Dieter; and Dippelhofer, Robert, 4,087,494, Cl. 264-78.000.

Breeze Corporations, Inc.: *See*—
Laky, Elmer; and Walsh, Ralph, 4,087,060, Cl. 242-158.00R.

Breitfuss, Thomas K. Apparatus for installing underground pipelines. 4,087,219, Cl. 425-59.000.

Brelsford, John E.: *See*—
Greiner, James G.; Brelsford, John E.; and Shriver, Joe E., 4,086,749, Cl. 56-98.000.

Bremer, Noel J.; White, James F.; and Milberger, Ernest C., to Standard Oil Company, The. Preparation of maleic anhydride from four-carbon hydrocarbons. 4,087,446, Cl. 260-346.750.

Brendle, Robert. Installation tool for tapped plugs. 4,086,799, Cl. 72-114.000.

Brendley, William H., Jr.: *See*—
Martorano, Richard; and Brendley, William H., Jr., 4,087,397, Cl. 260-29.6WB.

Bressan, David J., to United States of America, Navy. Fog-water conductivity measuring device. 4,087,743, Cl. 324-30.00R.

Breuer, Hermann: *See*—
Treuner, Uwe D.; and Breuer, Hermann, 4,087,423, Cl. 544-251.000.

Bridgestone Tire Company Limited: *See*—
Suzuki, Yasuo; Tamura, Akira; Sugihara, Shigeru; and Tezuka, Toshiro, 4,086,948, Cl. 152-355.000.

Briles, Franklin S. Dome headed rivet, and workpiece assembly. 4,086,839, Cl. 85-37.000.

Brinkley, Max D.: *See*—
Mangun, Clifford O.; Brinkley, Max D.; and Appleby, Paul E., 4,087,298, Cl. 156-136.000.

Bristol-Myers Company: *See*—
Vida, Julius A., 4,087,529, Cl. 424-254.000.

British Petroleum Company Limited, The: *See*—
Kolombos, Alexander John; McNeice, Donald; and Wood, Dennis Charles, 4,087,350, Cl. 208-121.000.

Britt, David L.: *See*—
Burks, Nathaniel W.; Ball, Newton E.; and Britt, David L., 4,086,917, Cl. 128-2.05T.

Brodart, Inc.: *See*—
Bonsall, George, 4,087,678, Cl. 235-86.000.

Brody, Herbert M.; and Weigle, George L., to International Telephone & Telegraph Corporation. Variable air volume air conditioning system. 4,086,781, Cl. 62-180.000.

Broken Hill Proprietary Company Limited, The: *See*—
Burn, Patrick Marion, 4,087,725, Cl. 318-52.000.

Brolin, Stephen Joseph; Lisco, Richard Joseph; and Manfred, Mark Thomas, to Bell Telephone Laboratories, Incorporated. Dual mode telephone subscriber loop current detector. 4,087,646, Cl. 179-18.0FA.

Brollo, Aurelio: *See*—
Angioletti, Attilio; and Brollo, Aurelio, 4,087,223, Cl. 425-112.000.

Brookes, Robert Frederick; Godson, David Henry; Greenwood, Douglas; Tulley, Margaret; and Wakerley, Stanley Brice, to Boots Company Limited, The. Herbicidal triazole carboxamides. 4,087,269, Cl. 71-92.000.

Brooks, Robert G.: *See*—
Russell, Carl D., 4,087,206, Cl. 417-53.000.

Brooks, Wretha M.: *See*—
Russell, Carl D., 4,087,206, Cl. 417-53.000.

Brouwer, Frans, to Conrac Corporation. Particulate products of combustion detector employing solid state elements. 4,087,799, Cl. 340-237.500.

Brown, Boveri and Cie AG: *See*—
Koch, Wilhelm, 4,086,787, Cl. 64-10.000.

Brown, Edward Morris: *See*—
Towns, Edward Johnson; Brown, Edward Morris; Dykstra, Leonard; Spano, Joseph Frank; and Proctor, John Daniel, 4,087,016, Cl. 215-211.000.

Brown, James L., to Rockwell International Corporation. Analog-to-digital conversion apparatus. 4,087,796, Cl. 340-187.000.

Brown, John G., Jr.: *See*—
Sargent, Michael R.; Schwartz, Robert G.; and Brown, John G., Jr., 4,087,295, Cl. 148-143.000.

Brown, Paul L. Spinable object on a length-adjustable tether detachably secured to a rotatable bobbin. 4,086,722, Cl. 46-61.000.

Brown, Richard E.; and Unangst, Paul C., to Warner-Lambert Company. 2-Methylsulfonylacetyl-3-indolol. 4,087,443, Cl. 260-326.12R.

Brown, Robert W.: *See*—
Foris, Peter L.; Brown, Robert W.; and Phillips, Paul S., Jr., 4,087,376, Cl. 252-316.000.

Brown, Steven H.; and Walter, David C. Hydroturbine engine device. 4,086,764, Cl. 60-325.000.

Brown, William L.; and Geronime, Robert L., to Rosemount Inc. Sensors for use in nuclear reactor cores. 4,087,693, Cl. 250-390.000.

Browning, Iben; Berney, Carl L.; Chapman, Robert G., Jr.; Glaser, George; Madden, John D.; and Postas, L. John, to Centigram Corporation. Continuous speech recognition apparatus. 4,087,630, Cl. 179-1.0SD.

Brownlee, Curtis Mitchell. Rolling seal for a well having a rod-type pump. 4,086,819, Cl. 74-18.200.

Buchschacher, Paul; Furst, Andor; Labler, Ludwig; Meier, Werner; and Scott, John William, to Hoffmann-La Roche, Inc. Methylation of de-A steroids. 4,087,436, Cl. 260-307.00H.

Bucolo, Giovanni; Madappally, Mathew M.; and Jaffe, Gerald E., to Coulter Electronics, Inc. Colorimetric method for determining gamma-glutamyl transpeptidase and compositions useful therein. 4,087,331, Cl. 195-99.000.

Budde, Paul B.; and Vatne, Robert D., to Dow Chemical Company, The. Method for the use of thienylvinylimidazoles as anthelmintics. 4,087,536, Cl. 424-273.00R.

Budlane, Stanley J., to General Electric Company. Method of actuating means for detecting radiant heat and system. 4,087,232, Cl. 431-66.000.

Buechner, Oskar: *See*—
Mietzner, Franz Georg; Buechner, Oskar; Steigerwald, Klaus; Schlichthaerle, Gottfried; and Urban, Friedrich, 4,087,602, Cl. 528-481.000.
Pfleger, Klaus; Zacher, Wieland; Boettcher, Klaus; Skorczyk, Ronald; Buechner, Oskar; and Mietzner, Franz Georg, 4,087,601, Cl. 526-329.000.

Buhring, Otto: *See*—
Opitz, Wolfgang; Buhring, Otto; and Hennen, Hans, 4,087,497, Cl. 261-118.000.

Bull, Dale L., to Nartron Corporation. Electrical branch circuit structure means. 4,087,696, Cl. 307-10.0LS.

Bullard, James R. Laryngoscope. 4,086,919, Cl. 128-11.000.

Bumgardner, Donald L.: *See*—
Mack, Ronald H.; and Bumgardner, Donald L., 4,087,680, Cl. 235-449.000.

Bunch, Laverne R.: *See*—
Hellstrom, Melbourne J.; Bunch, Laverne R.; and Froger, Henri, 4,087,694, Cl. 250-445.00T.

Bunker Ramo Corporation: *See*—
Bauerle, Gerhard, 4,087,148, Cl. 339-75.0MP.
Golladay, James D.; and Abler, Norman C., 4,086,789, Cl. 66-9.00B.
Heider, Wolfgang; Heiland, Hans; and Schroetter, Wolfgang Adalbert, 4,087,667, Cl. 200-245.000.

Burdette, George W., to United States of America, Navy. High density-high volumetric heating value liquid ramjet. 4,087,257, Cl. 44-80.000.

Burger, Joanne D.: *See*—
Sherrod, Fred A.; Howard, William L.; and Burger, Joanne D., 4,087,453, Cl. 560-240.000.

Burk, David L., to Allegheny Ludlum Industries, Inc. Plate hold-down device for abrasive cutting of metal plates. 4,086,731, Cl. 51-216.00R.

Burks, Nathaniel W.; Ball, Newton E.; and Britt, David L., to Medical Instruments & Technology Corp. Fetal heart rate monitoring system. 4,086,917, Cl. 128-2.05T.

Burn, Patrick Marion, to Broken Hill Proprietary Company Limited, The. Coke oven hot cars. 4,087,725, Cl. 318-52.000.

Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, to Hoffman-La

Roche Inc. Cyano-4-(0,0-dialkylphosphoryloxy)-cyclohex-4-enes. 4,087,488, Cl. 260-940.000.

Burroughs Corporation: *See—*
Beery, Jack, 4,087,173, Cl. 355-24.000.
Beery, Jack, 4,087,789, Cl. 340-146.30C.
Mack, Ronald H.; and Bumgardner, Donald L., 4,087,680, Cl. 235-449.000.
McElligott, Michael Jerry; Williams, John Lewis; and Gauger, Russell William, Jr., 4,087,580, Cl. 428-307.000.

Burt, Warren T., to United States of America, Navy. Wide angle seeker. 4,087,061, Cl. 244-3.160.

Burton, Ralph M.: *See—*
Jencks, Hollis W.; Jencks, David C.; and Burton, Ralph M., 4,087,773, Cl. 335-243.000.

Butler, Richard William, to USM Corporation. Carpet retainers. 4,086,679, Cl. 16-4.000.

Butz, Hans: *See—*
Schrewe, Hans; Funderich, Hans-Dieter; and Butz, Hans, 4,086,957, Cl. 165-89.000.

Byers, James Otto, Jr., to Commercial Shearing, Inc. Track drive circuits with synchronization and steering systems. 4,086,767, Cl. 60-395.000.

Bylund, Don M., to Milliken Research Corporation. Carpet machine. 4,087,311, Cl. 156-511.000.

Byrd, Carlisle O., Jr., to Johns-Manville Corporation. Refractory fiber blanket module with heat shrinkage compensation. 4,086,737, Cl. 52-227.000.

Caddy Corporation of America: *See—*
Rothschild, Henry H., 4,086,907, Cl. 126-246.000.

Caffey, Larry G., to United States of America, Navy. Parachute suspension line stowage device. 4,087,063, Cl. 244-148.000.

Cale, Albert Duncan, Jr., to A. H. Robins Company, Inc. N-(1-substituted-3-pyrrolidinyl)-4-quinoline carboxamides. 4,087,428, Cl. 260-287.00F.

Camac, Morton; and Bien, Fritz, to Aerodyne Research, Inc. Motion detection and measurement. 4,086,808, Cl. 73-655.000.

Campbell, James L.: *See—*
Profenna, Leonardo C.; and Campbell, James L., 4,087,009, Cl. 214-131.00A.

Campbell, Kenneth C.; Schaer, Werner; and Swanstrom, Harry W., to Xerox Corporation. Microprocessor for an automatic word-processing system. 4,087,852, Cl. 364-200.000.

Canada Packers Limited: *See—*
Bharucha, Kekhusroo R.; and Coleman, Michael H., 4,087,561, Cl. 426-266.000.

Canadian Gas Research Institute: *See—*
Khoo, Sian W., 4,087,742, Cl. 324-29.000.

Canadian Patents & Development Limited: *See—*
Barszczewski, Andrzej; and Hardwick, Charles D., 4,087,816, Cl. 343-105.00R.

Canavello, Benjamin John; Hatzakis, Michael; Siegel, Arthur Richard; and Watters, Connell, to International Business Machines Corporation. Novel resist spinning head. 4,086,870, Cl. 118-52.000.

Canon Kabushiki Kaisha: *See—*
Masaki, Katsumi; and Goshima, Takeshi, 4,087,838, Cl. 358-199.000.

Capdebosc, Andre; and Moinard, Michel, to Societe Nationale Elf Aquitaine (Production). Fluid pressure operated duct coupling. 4,087,119, Cl. 285-18.000.

Capuano, Italo A., to Olin Corporation. Process for the safe production of polychloroisocyanurates. 4,087,607, Cl. 544-190.000.

Capurka, Zbynek Antonin; and Vargas, Robert J., to Motorola, Inc. Rotary direction sensor for engine ignition control. 4,086,894, Cl. 123-148.00S.

Carbo-Economy, S.A.: *See—*
Petermann, Walter E., 4,087,493, Cl. 261-44.00D.

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Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,087,855, Cl. 364-200.000.

Carlson, David H. J., to UOP Inc. Preparation of a supported metal phthalocyanine. 4,087,378, Cl. 252-428.000.

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Carmichael, Philip Duncan: *See—*
Dunn, James Grant; and Carmichael, Philip Duncan, 4,087,677, Cl. 325-30.000.

Carnegie-Mellon University: *See—*
Zdrojkowski, Ronald J.; and Longini, Richard L., 4,087,840, Cl. 360-41.000.

Carrico, Philip Hugh, to General Electric Company. Thermoplastic cooling method. 4,087,504, Cl. 264-89.000.

Carter, Neal E. Bag for carrying motion picture film cans of different sizes. 4,086,945, Cl. 150-52.00J.

Casagrande, Serge, to Controlled Systems (Windsor) Limited. Battery charger. 4,087,733, Cl. 320-21.000.

Casberg, John M.: *See—*
Faust, John P.; Cramer, Henry R.; and Casberg, John M., 4,087,360, Cl. 210-58.000.

Cash, Dennis R.: *See—*
Strahorn, David F.; Goldstein, Roger F.; and Cash, Dennis R., 4,087,252, Cl. 23-288.00R.

Casio Computer Co., Ltd.: *See—*
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Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Heinrich, Ernst; Ribka, Jachim; and Valentin, Joachim, 4,087,420, Cl. 260-207.000.

Casson, Harold Vincent; and Loftfield, Richard Eric, to Huron Chemicals, Ltd. Electrolytic cell. 4,087,344, Cl. 204-239.000.

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Boggs, Roger L.; and Sogge, John W., 4,087,136, Cl. 305-57.000.
Eftefield, Larry G.; Lukavich, Paul J.; and Mitchell, Roger R., 4,086,967, Cl. 172-777.000.
Johnson, David G., 4,086,824, Cl. 74-481.000.
Karstensen, Karl W.; and Meints, Edward G., 4,086,757, Cl. 60-39.16R.
Karstensen, Karl W.; Thompson, LeRoy R.; and Wenninger, James F., 4,086,759, Cl. 60-39.080.
Koch, Franklin O., Jr., 4,086,993, Cl. 192-104.00F.
Lanz, William E.; and Olson, Harris S., 4,086,966, Cl. 172-767.000.
Lorimor, Larry W., 4,086,843, Cl. 91-413.000.
McReynolds, Charles P., 4,086,712, Cl. 37-118.00A.
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Cates, Robert P.: *See—*
Beene, Gerald Wayne; and Cates, Robert P., 4,087,639, Cl. 179-2.50R.

Caudle, Otis M., to Eggineers, Inc. Case packing apparatus. 4,086,745, Cl. 53-159.000.

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Freeman, Henry J.; and Dinwiddie, John M., 4,086,916, Cl. 128-2.05T.

Ceagfilter und Entstaubungstechnik GmbH: *See—*
Strathoff, Dieter; Winter, Karl; and Staschik, Gunter, 4,087,260, Cl. 55-28.000.

Celamerck GmbH & Co., KG: *See—*
Curtze, Jurgen; Thomas, Klaus; Ost, Walter; and Drandarewski, Christo Assenov, 4,087,533, Cl. 424-269.000.

Centanni, Michael J., to Continental Group, Inc., The. Lined bulk container and liner therefore. 4,087,041, Cl. 220-441.000.

Centigram Corporation: *See—*
Browning, Iben; Berney, Carl L.; Chapman, Robert G., Jr.; Glaser, George; Madden, John D.; and Postas, L. John, 4,087,630, Cl. 179-1.0SD.

Cerberus AG: *See—*
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Hudecek, Slavko; Gavrilova, Ivana; Beran, Miroslav; and Juracka, Frantisek, 4,087,396, Cl. 260-29.60H.
Wichterle, Otto; and Coupek, Jiri, 4,087,487, Cl. 260-901.000.
Wichterle, Otto; Coupek, Jiri; and Krivakova, Miroslava, 4,087,598, Cl. 526-16.000.

CGR Medical Corporation: *See—*
Hellstrom, Melbourne J.; Bunch, Laverne R.; and Froger, Henri, 4,087,694, Cl. 250-445.00T.

Cha, Chang Yul, to Occidental Oil Shale, Inc. Decreasing hydrogen sulfide concentration of a gas. 4,086,962, Cl. 166-259.000.

Chambers, William W.: *See—*
Teichert, Allen L.; and Chambers, William W., 4,087,229, Cl. 431-43.000.

Champion International Corporation: *See—*
Adamek, David J., 4,087,003, Cl. 206-583.000.
Golden, Ronald; Cohen, Allan H.; and Eby, David G., 4,087,284, Cl. 106-21.000.
Vincent, David N.; and Golden, Ronald, 4,087,581, Cl. 428-327.000.

Chana, Howard E., to General Motors Corporation. Four-speed transmission. 4,086,827, Cl. 74-759.000.

Chang, Hou-Min: *See—*
Jividen, Gay M.; Chang, Hou-Min; Reeves, R. Heath; and Chen, Chen-Loung, 4,087,316, Cl. 162-14.000.

Chapin, Leonard Lee, to Autotronic Controls, Corp. Carburetor with hollow air control valve. 4,087,491, Cl. 261-36.00A.

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Chappell, Walter L.; Cleveland, John T.; and Watts, John D. Method and apparatus for gas induced production of liquid from wells. 4,087,207, Cl. 417-54.000.

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Olofsen, Oluf Per; Lund, Kaj Sonnik; and Jorgensen, Bent Karlo, 4,087,133, Cl. 302-2.00R.

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Chemplex Company: *See—*
Shida, Mitsuzo; Machonis, John, Jr.; Schmukler, Seymour; and Zeitlin, Robert J., 4,087,587, Cl. 428-500.000.
Shida, Mitsuzo; Machonis, John, Jr.; Schmukler, Seymour; and Zeitlin, Robert J., 4,087,588, Cl. 428-500.000.

Chen, Chen-Loung: *See*—
Jividen, Gay M.; Chang, Hou-Min; Reeves, R. Heath; and Chen, Chen-Loung, 4,087,316, Cl. 162-14.000.
Chen, Michael S.: *See*—
Block, Charles S.; Chen, Michael S.; Noichl, Olaf J.; and Hong, Sun-Nan, 4,087,361, Cl. 210-199.000.
Chen, Winston Hsong; and Titcomb, Stanley Carpenter, to International Business Machines Corporation. Ink jet printing intensity modulation. 4,087,825, Cl. 346-75.000.
Chenoweth, Charles E. Apparatus employing an intermediate vehicle for operably intercoupling a tractor or the like with railroad cars. 4,086,856, Cl. 105-1.00A.
Chermin, Hubertus Mathias Jozef; and Smulders, Herman Adrianus Godefridus, to U.S. Philips Corporation. Arrangement for starting and operating a discharge lamp. 4,087,723, Cl. 315-207.000.
Chesebrough-Pond's Inc.: *See*—
Russo, Ronald D., 4,086,918, Cl. 128-2.080.
Chestel, Inc.: *See*—
Joslow, David L.; Bloch, Alan; Henthorn, Lincoln; and Straube, Harold M., 4,087,643, Cl. 179-15.0AL.
Chevallier, Rene; and Sauvage, Michel, to Societe Generale de Constructions Electriques et Mecaniques Alsthom S.A.; and Commissariat a l'Energie Atomique. Nuclear reactor. 4,087,325, Cl. 176-65.000.
Chevron Research Company: *See*—
Langlois, Gordon E.; and Tamm, Paul W., 4,087,347, Cl. 208-11.00R.
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Chiaradonna, Carmine M. Wind shielding dome. 4,086,674, Cl. 5-113.000.
Chloride Connrex Corporation: *See*—
Cornette, Earl B.; and Hahn, Laurence W., 4,086,695, Cl. 29-623.100.
Christy, Robert Fell, to Robert Christy Engineering Limited. Packaging machines. 4,086,746, Cl. 53-188.000.
Chu Associates, Inc.: *See*—
Faigen, Ivan; and Ergene, Ahmet, 4,087,823, Cl. 343-791.000.
Churley, George, to Hobart Corporation. Door and drain control interlock. 4,086,938, Cl. 137-586.000.
Chute, Richard, to Eaton Corporation. Gas turbine. 4,086,760, Cl. 60-39.360.
Ciba-Geigy Corporation: *See*—
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Lee, Chien Yung, 4,087,441, Cl. 260-326.00N.
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Corbett, David A.; and Clark, Frederick E., 4,087,036, Cl. 228-102.000.
Clasen, Helmut; and Deneke, Klaus, to Dynamit Nobel Aktiengesellschaft. Electrical heating assembly having a thermally conductive refractory electrical insulating embedding composition between an electrically conductive member and a jacket. 4,087,777, Cl. 338-238.000.
Clem, Arthur G., to American Colloid Company. Super-yield bentonite base drilling fluid. 4,087,365, Cl. 252-8.50A.
Clemens, David H.: *See*—
Barrett, James H.; and Clemens, David H., 4,087,357, Cl. 210-32.000.
Clemens, James A.: *See*—
Flaugh, Michael E.; and Clemens, James A., 4,087,444, Cl. 260-326.13B.
Clement, Joseph J. Missile propelling device and missile therefor. 4,086,901, Cl. 124-21.000.
Clements, Lawrence H. Built-in scaffold support. 4,086,978, Cl. 182-82.000.
Cleveland, John T.: *See*—
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Cline, Harvey E.; and Anthony, Thomas R., to General Electric Company. Apparatus for imparting combined centrosymmetric and noncentro-symmetric rotation to semiconductor bodies. 4,087,239, Cl. 432-124.000.
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Thomas, Manuel Andrew; and Cogan, Jerry Albert, Jr., 4,087,243, Cl. 8-31.000.
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Cohen, Allan H.: *See*—
Golden, Ronald; Cohen, Allan H.; and Eby, David G., 4,087,284, Cl. 106-21.000.
Colditz, Eugene F.: *See*—
Krause, John D.; and Colditz, Eugene F., 4,086,670, Cl. 4-295.000.
Coleman, Michael H.: *See*—
Bharucha, Kekhusroo R.; and Coleman, Michael H., 4,087,561, Cl. 426-266.000.
Coleman, Ronald K.: *See*—
Gorton, Philip S.; and Coleman, Ronald K., 4,086,747, Cl. 53-340.000.
Colgate-Palmolive Company: *See*—
Borrello, Giuseppe, 4,087,368, Cl. 252-89.00R.
Hendrickson, Thomas C., 4,087,577, Cl. 428-110.000.
Collier-Keyworth Company: *See*—
Parker, James A., 4,087,071, Cl. 248-406.000.
Collins, Paul W.; and Pappo, Raphael, to G. D. Searle & Co. Anti-secretory prostaglandins intermediates. 4,087,447, Cl. 260-429.700.
Collins, Paul W.; and Pappo, Raphael, to G. D. Searle & Co. 7-{3-Hydroxy-2β-[4-hydroxy-4-(lower alkyl)-trans-1-octen-1-yl]-5-oxocyclopent-1α-yl}hept-5-cis-enoic acids and related compounds. 4,087,621, Cl. 560-231.000.
Collins, William C.: *See*—
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Colonial Pipeline Company: *See*—
Bagwell, Marshall Underwood; and Barrett, Arnold Eugene, 4,086,934, Cl. 137-322.000.
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Columbia Ribbon & Carbon Mfg. Co., Inc.: *See*—
Newman, Douglas A., 4,087,579, Cl. 428-216.000.
Colville, William T.; Mecone, David W.; and Audesse, Emery G., to GTE Sylvania Incorporated. Multilamp photoflash unit having radiant-energy-activated quick-connect switch. 4,087,849, Cl. 362-13.000.
Combis, Christofalo C. Foot bath. 4,086,669, Cl. 4-182.000.
Commercial Shearing, Inc.: *See*—
Byers, James Otto, Jr., 4,086,767, Cl. 60-395.000.
Commissariat a l'Energie Atomique: *See*—
Bossens, Jacky; and Lacourieux, Jean Louis, 4,087,097, Cl. 277-3.000.
Chevallier, Rene; and Sauvage, Michel, 4,087,325, Cl. 176-65.000.
Pigeon, Michel; and Saglio, Robert, 4,087,748, Cl. 324-220.000.
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Communications Satellite Corporation: *See*—
Kreutel, Randall William, Jr., 4,087,818, Cl. 343-176.000.
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Beard, Robert M., 4,086,776, Cl. 61-69.00R.
Compton, Leslie E., to Occidental Oil Shale, Inc. Method of oxidizing hydrogen sulfide. 4,086,963, Cl. 166-259.000.
Concannon, Thomas Patrick, to Du Pont de Nemours, E. I., and Company. Aqueous dispersions of perfluoroolefin polymers containing film-forming materials. 4,087,394, Cl. 260-29.60F.
Conkerton, Lawrence J. Book holder for microfilming. 4,087,179, Cl. 355-76.000.
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Bernecker, Gunther, 4,086,893, Cl. 123-122.00E.
Conmaco, Inc.: *See*—
Wandell, George C., 4,086,968, Cl. 173-115.000.
Conrac Corporation: *See*—
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Conrow, Ransom Brown; and Bernstein, Seymour, to American Cyanamid Company. 1,3,5- Or 1,3,6-naphthalenetriyltris(sulfonylimino)aryl acids and salts. 4,087,613, Cl. 560-10.000.
Consumer Idea Centers, Inc.: *See*—
Wax, Miriam P., 4,087,144, Cl. 312-258.000.
Continental Group, Inc., The: *See*—
Centanni, Michael J., 4,087,041, Cl. 220-441.000.
Pan, Peter Naw Yank, 4,086,872, Cl. 118-630.000.
Trimble, Roy Lane, 4,086,684, Cl. 17-41.000.
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Convers, Ronald J.; Fetzer, Paul L.; Hackett, Homer L.; and Starks, Charles M., 4,087,474, Cl. 260-652.00P.
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Convers, Ronald J.; and Rose, Le Roy, to Continental Oil Company. Air initiation for detergent range pendant or internal olefin sulfitation. 4,087,457, Cl. 260-513.00B.
Convers, Ronald J.; Fetzer, Paul L.; Hackett, Homer L.; and Starks, Charles M., to Continental Oil Company. Process for the purification of 1,2-dichloroethane. 4,087,474, Cl. 260-652.00P.
Coogan, Joseph Francis, III: *See*—
Jones, Gary Victor; and Coogan, Joseph Francis, III, 4,087,562, Cl. 426-428.000.
Cook, Barry, to Ciba-Geigy Corporation. Polymers stabilized with substituted 2-(piperidinyl-4')-ethyl alcohol and salts thereof. 4,087,404, Cl. 260-45.80N.
Cook, Roy Gordon; and Jackson, James Patrick, to Parke, Davis & Company. Method of producing a fluid absorbent web. 4,087,506, Cl. 264-112.000.
Copeland, Mark I.: *See*—
Dunning, John S.; Copeland, Mark I.; and Howe, John S., 4,087,287, Cl. 148-3.000.
Coppola, Pasquale J., to Olin Corporation. Semi-rigid polyurethane foam used in packaging. 4,087,389, Cl. 260-2.5AP.
Corbett, David A.; and Clark, Frederick E., to Pemtec, Inc. Friction welding method and apparatus. 4,087,036, Cl. 228-102.000.
Corda, Francesco: *See*—
Piccardi, Paolo; Corda, Francesco; Gozzo, Franco; Longoni, Angelo; and Renis, Giovanni, 4,087,489, Cl. 260-949.000.
Cornette, Earl B.; and Hahn, Laurence W., to Chloride Connrex Corporation. Methods for the in-situ casting of inter-cell connectors. 4,086,695, Cl. 29-623.100.
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Gregory, Jerry L.; and Pitcher, Wayne H., Jr., 4,087,330, Cl. 426-68.000.

Lentz, William P., 4,087,268, Cl. 65-129.000.
Stookey, Stanley Donald; and Wedding, Brent Merle, 4,087,280, Cl. 96-27.00R.
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Cotton Incorporated: *See—*
Jividen, Gay M.; Chang, Hou-Min; Reeves, R. Heath; and Chen, Chen-Loung, 4,087,316, Cl. 162-14.000.
Cotugno, Julia. Game chip dispenser with marker. 4,087,021, Cl. 221-199.000.
Coulter Electronics, Inc.: *See—*
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Coupek, Jiri: *See—*
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Wichterle, Otto; Coupek, Jiri; and Krivakova, Miroslava, 4,087,598, Cl. 526-16.000.
Covey, George H., III; and Stenabaugh, Donald D., to Presray Corporation, The. Seal and actuator for pipe testing. 4,086,806, Cl. 73-49.500.
Cox, John Michael: *See—*
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Cox, Raymond C., Jr.: *See—*
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Cragoe, Edward J., Jr.; Jones, James H.; and Bicking, John B., to Merck & Co., Inc. 8-Aza-9-dioxothiaprostanoic acids. 4,087,435, Cl. 260-301.000.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., to Merck & Co., Inc. (3-Amino-5-substituted-6-fluoropyrazinoyl or pyrazamido)-guanidines and their derivatives bearing substituents on the guanidino nitrogens. 4,087,526, Cl. 424-250.000.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., to Merck & Co., Inc. 2,3-Dihydro-6,7-disubstituted-5-acyl benzofuran-2-carboxylic acids. 4,087,542, Cl. 424-275.000.
Craine, James F. Brain damage testing. 4,086,710, Cl. 35-22.00R.
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CRC-Crose International, Inc.: *See—*
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Cronin, Timothy H.; Faubl, Hermann; Hoffman, William W.; and Korst, James J., to Pfizer Inc. Interferon induction in animals by amines. 4,087,552, Cl. 424-330.000.
Cross, Barrington; Grasso, Charles Paul; and Walworth, Bryant Leonidas, to American Cyanamid Company. Process for preparing pyrazolidines compounds. 4,087,612, Cl. 548-356.000.
Cross, Robert K.: *See—*
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Csosz, Gabor, to Vereinigte Baubeschlagfabriken Gretsch & Co. GmbH. Toe iron. 4,087,114, Cl. 280-625.000.
Cull, Neville L.: *See—*
Gernand, Martin O.; Maness, Dale D.; and Cull, Neville L., 4,087,383, Cl. 252-463.000.
Cunnell, Michael Derek, to Lucas Industries Limited. Disc brake operating piston. 4,086,985, Cl. 188-72.400.
Cunningham, Vernon R., to Rockwell International Corporation. Constant delay resonant tank circuit combination for frequency discrimination. 4,087,757, Cl. 329-143.000.
Curiger, Karl; Gasser, Hermann; and Wuest, Stephan, to Luwa AG. Monitoring apparatus for a textile machine. 4,087,700, Cl. 307-116.000.
Curtze, Jurgen; Thomas, Klaus; Ost, Walter; and Drandarewski, Christo Assenov, to Celamerck GmbH & Co., KG. 1-(1-Acylamino-2,2,3-trichloro-propyl)-imidazoles and 1,2,4-triazoles. 4,087,533, Cl. 424-269.000.
Custer, Harry Samuel; and Schisler, Robert Charles, to Goodyear Tire & Rubber Company, The. Flexible cover of a platy-filled composition for an electrolytic cell. 4,087,343, Cl. 204-219.000.
Cutler-Hammer, Inc.: *See—*
Hyink, Roy; Jaskolski, Stanley V.; Lade, Robert W.; Schutten, Herman P.; and Spellman, Gordon B., 4,087,848, Cl. 361-103.000.
Cutters Machine Company, Inc.: *See—*
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Daimler-Benz Aktiengesellschaft: *See—*
Eisele, Erwin; Binder, Klaus; and Drexl, Klaus, 4,086,878, Cl. 123-1.00A.
Wulf, Helmut; Weidemann, Wolfgang; Stolz, Albert; and Volz, Wolfgang, 4,087,047, Cl. 237-12.30B.
Daisley, Robert Thomas, to Molins Limited. Conveyors for rod-like articles. 4,087,001, Cl. 198-456.000.
Dalrymple, Guerry M. Anti theft apparatus for mobile radio antennas. 4,087,819, Cl. 343-715.000.
Dammgen, Jurgen: *See—*
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Dana Corporation: *See—*
Phelps, Orville F.; and MacRitchie, Innis J., 4,087,593, Cl. 428-683.000.
Danahy, Thomas Michael; and Kilroy, Joseph Anthony, to Huyck Corporation. Apparatus for cleaning an endless belt having an affixed signal element. 4,087,320, Cl. 162-252.000.
Daniel International Corporation: *See—*
Landrigan, Larry P., 4,086,736, Cl. 52-221.000.
Danneberg, Peter: *See—*
Langbein, Adolf; Walther, Gerhard; Danneberg, Peter; and Kuhn, Franz Josef, 4,087,531, Cl. 424-267.000.
Datis, Angelo P., to Process Products, Inc. Gasoline station emissions control. 4,087,228, Cl. 431-5.000.
Davis, Lynn M.; and Theis, James V., Jr., to Hollymatic Corporation. Meat tenderizing apparatus. 4,086,683, Cl. 17-25.000.
Davis, Robert E. Method of catalyst preparation for use in suppressing hydrocarbon and carbon monoxide emission from internal combustion engines. 4,087,384, Cl. 252-472.000.
Davis, Thomas R. Dead bolt lock. 4,087,121, Cl. 292-139.000.
Davis, William F. Motorcycle frame and suspension and methods of making and using the same. 4,087,109, Cl. 280-284.000.
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Dawson, John Richard: *See—*
Jessop, Anthony; and Dawson, John Richard, 4,087,642, Cl. 179-15.0BM.
Dawson, Robert E. Combination fire grate and fireplace cooking apparatus. 4,086,905, Cl. 126-25.00A.
Deacon, George Ronald, to International Telephone & Telegraph Corporation. Single optical fiber connector utilizing spherical alignment elements. 4,087,155, Cl. 350-96.210.
Deas, Warren. Illuminated insect trap having single transparent plate. 4,086,721, Cl. 43-113.000.
De Bucs, Eugen Szabo: *See—*
Henkel, Hans-Joachim; and De Bucs, Eugen Szabo, 4,086,877, Cl. 123-1.00A.
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Feder, Joseph; Ku, Katharine; and Kuo, Mau-Jung, to Monsanto Company. Mammalion cell culture process. 4,087,327, Cl. 195-1.700.

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Brady, John F.; and Pyle, Lawrence F., 4,087,191, Cl. 404-69.000.

Fenner, Peter M. Backpacking frame. 4,087,031, Cl. 224-25.00A.

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Ferris, Donald Leroy, to United Technologies Corporation. Cross beam rotor. 4,087,203, Cl. 416-141.000.

Fetzer, Paul L.: *See—*
Convers, Ronald J.; Fetzer, Paul L.; Hackett, Homer L.; and Starks, Charles M., 4,087,474, Cl. 260-652.00P.

Fiberwoven Corporation, The: *See—*
Smith, Alexander M., II, 4,086,687, Cl. 28-103.000.

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Figov, Murray; Kent, Alan Walter; Stephenson, Raymond Owen; and Watts, Peter Edward, to Vickers Limited. Lithographic printing plate preparation. 4,086,853, Cl. 101-463.000.

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Foster, Ronald Charles; and Pilarski, Regis Victor, 4,086,795, Cl. 70-233.000.

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Pietryka, Joseph, 4,086,955, Cl. 164-446.000.

Flaugh, Michael E.; and Clemens, James A., to Eli Lilly and Company. Amides as ovulation inhibitors. 4,087,444, Cl. 260-326.13B.

Fleming, David Leslie, to Sperry Rand Corporation. Magneto-optic bubble domain histograph. 4,087,809, Cl. 340-324.00R.

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FMC Corporation: *See—*
Dounchis, Harry, 4,087,386, Cl. 252-49.800.

Focht, Ronald E., to Hobart Corporation. Door and drain control interlock. 4,086,929, Cl. 134-56.00D.

Fogg, Daniel A., to Gerber Products Company. Assembly line container inverter. 4,087,012, Cl. 214-312.000.

Ford Motor Company: *See—*
Badcock, Sidney C.; Dreissiger, Joseph L.; Holby, Brian J.; and Pardy, Ronald P., 4,086,825, Cl. 74-492.000.
Brace, John F. G.; Dreissiger, Joseph L.; and Earle, Anthony N. C., 4,087,117, Cl. 280-724.000.
Earle, Anthony Nigel Clifford, 4,087,115, Cl. 280-720.000.
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Fay, Charles Robert; and Williams, Raymond Joseph, 4,087,568, Cl. 427-8.000.

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Forster, Denis; and Schaefer, George F., to Monsanto Company. Hydrogenolysis of hydrobenzoins. 4,087,463, Cl. 260-613.00A.

Foseco Trading A.G.: *See—*
Annett, Keith, 4,086,740, Cl. 52-511.000.

Fosseen, Dwayne L. Handle for a tractor cab door. 4,086,728, Cl. 49-460.000.

Foster, Frank L.: *See—*
Wilcox, Wayne E.; and Foster, Frank L., 4,086,939, Cl. 137-614.030.

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Zabotto, Guy; Guichard, Jean-Marie; and Fournier, Daniel, 4,087,253, Cl. 23-297.000.

Frank, Floyd; and Woodward, Aylmer John, to Monsanto North Carolina Incorporated. Production of variegated polyester yarn and fabric. 4,087,242, Cl. 8-15.000.

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Fraser, Kenneth Donald. Dual sound track sensor and calibration strip therefor. 4,087,634, Cl. 179-100.30L.

Fraser, Lawrence J., to Xerox Corporation. Charging system for electrostatic reproduction machine. 4,087,168, Cl. 355-3.0CH.

Frater, Robert L.: *See—*
Beatty, John M.; and Frater, Robert L., 4,087,860, Cl. 364-494.000.

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Freeman, Henry J.; and Dinwiddie, John M., to Cayre, Joseph J. Cardiac monitor wristwatch. 4,086,916, Cl. 128-2.05T.

Freeman, John M. Solar collector panel. 4,086,912, Cl. 126-271.000.

Frem Corporation: *See—*
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Frenkel, Andrei Filippovich: *See—*
Korenblit, Izya Yakovlevich; Kaplansky, Arkady Fridmanovich; Arkhipov, Vladimir Viktorovich; Frenkel, Andrei Filippovich; and Sarychev, Jury Pavlovich, 4,087,200, Cl. 415-199.200.

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Friedman, Ludmila: *See—*
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Friedrich Kocks GmbH & Co.: *See—*
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Froger, Henri: *See—*
Hellstrom, Melbourne J.; Bunch, Laverne R.; and Froger, Henri, 4,087,694, Cl. 250-445.00T.

Froot, Howard Arthur, to International Business Machines Corporation. Fluorescent microanalytical system and method for detecting and identifying organic materials. 4,087,685, Cl. 250-302.000.

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Fuji Electric Co., Ltd.: *See—*
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Mitsui, Akio; Miyazako, Takushi; and Ogawa, Takashi, 4,087,282, Cl. 96-94.00R.
Shirahata, Ryuji; and Kitamoto, Tatsuji, 4,087,582, Cl. 428-333.000.
Yamaguchi, June; Tsuji, Nobuo; Omichi, Takenori; and Yamaguchi, Teruo, 4,087,574, Cl. 427-407.00F.

Fujii, Yuichi: *See—*
Tsuji, Shoichi; Asai, Minoru; and Fujii, Yuichi, 4,087,050, Cl. 239-490.000.

Fujiike, Hiroshi: *See—*
Uda, Kazumi; Tamura, Motohiko; Nishiura, Ichiro; and Fujiike, Hiroshi, 4,087,208, Cl. 417-54.000.

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Fujimoto, Katsuhiko: *See—*
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Nakamura, Michihiro; Fujiwara, Yuzuru; and Yasui, Teruo, 4,087,622, Cl. 560-245.000.

Fukada, Kenshi: *See—*
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Fukase, Yasuji, to Rank Xerox Ltd. Fixing apparatus with heat and pressure for electrophotographic copiers. 4,087,676, Cl. 219-216.000.

Fukumoto, Nobuo; Ohiwa, Mitsugo; Matsui, Teruyoshi; and Ohta, Hajime, to Nippon Gakki Seizo Kabushiki Kaisha. Audio power amplifier. 4,087,761, Cl. 330-267.000.

Funderich, Hans-Dieter: *See*—
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Furneaux, Frederick Arthur S., to Sinclair Radio Laboratories Limited. Module for cavity resonance devices. 4,087,768, Cl. 333-83.00R.
Furst, Andor: *See*—
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Fuschetto, William R.: *See*—
Allen, Joseph A.; and Fuschetto, William R., 4,087,750, Cl. 325-363.000.
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Futch, Wilbur O. Solar heating device. 4,086,911, Cl. 126-271.000.
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Collins, Paul W.; and Pappo, Raphael, 4,087,447, Cl. 260-429.700.
Collins, Paul W.; and Pappo, Raphael, 4,087,621, Cl. 560-231.000.
G. D. Societa per Azioni: *See*—
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GAF Corporation: *See*—
Battisti, Angelo J., 4,087,283, Cl. 96-111.000.
Schneider, Louis; and Graham, David E., 4,087,270, Cl. 71-95.000.
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Skinner, David B., 4,087,400, Cl. 260-30.40N.
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Galesloot, Wilhelmus Gerardus: *See*—
Willems, Albert; and Galesloot, Wilhelmus Gerardus, 4,087,387, Cl. 252-524.000.
Gallagher, Thomas F.: *See*—
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Gammarino, Rudolph Ronald; and Theologos, John James, to United States of America, Army. Laser hit indicator using reflective materials. 4,086,711, Cl. 35-25.000.
Gangi, Robert J., to Joan Manufacturing Corporation. Reverse racking mechanism for warp knitting machine. 4,086,791, Cl. 66-207.000.
Gangi, Robert J., to Joan Manufacturing Corporation. Weft inlay racking control. 4,086,792, Cl. 66-207.000.
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Garcia, Antonio Alcaide; Ruiz, Juan Ramon Conde; and Lozano, Juan Bermejo, to Laboratorios Liade, S.A. N,N-Disulfonylpiperazines. 4,087,425, Cl. 544-383.000.
Gardner, Leo Max. Golf bag support. 4,087,068, Cl. 248-96.000.
Garofalo, Frank J.: *See*—
Moon, Roger A.; and Garofalo, Frank J., 4,086,884, Cl. 123-32.0EB.
Garrett, Donald E., to Occidental Petroleum Corporation. Process for the gasification of coal in situ. 4,087,130, Cl. 299-2.000.
Garrison, Charles Michael; Mast, Roy Clark; and Robbins, Medford Dwight, to Procter & Gamble Company, The. Thiocarbamate-based sustained release herbicides. 4,087,273, Cl. 71-100.000.
Garrison, John B.; Queen, James L.; and Grant, David G., to United States of America, Navy. Hybrid digital-optical radar signal processor. 4,087,815, Cl. 343-9.000.
Garrison, Marion A., to Empire Oil Tool Company. Drive having a plurality of thrust bearings. 4,086,788, Cl. 64-23.000.
Gasser, Hermann: *See*—
Curiger, Karl; Gasser, Hermann; and Wuest, Stephan, 4,087,700, Cl. 307-116.000.
Gates, John I. Method for manufacture of window with extruded synthetic frame and the like. 4,087,509, Cl. 264-295.000.
Gatewood, Sidney Ulane, to Borg-Warner Corporation. Self-adjusting clutch release bearing carrier assembly. 4,086,996, Cl. 192-111.00A.
Gauger, Russell William, Jr.: *See*—
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Gavin, Joseph G., to Grumman Aerospace Corporation. Solar heat collector construction. 4,086,913, Cl. 126-271.000.
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Hudecek, Slavko; Gavrilova, Ivana; Beran, Miroslav; and Juracka, Frantisek, 4,087,396, Cl. 260-29.60H.
Gaylord, James K. Air fuel inlet device for internal combustion engines. 4,086,899, Cl. 123-141.000.
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Traben, Josef, 4,086,944, Cl. 144-3.00P.
Geerdes, Dirk J. F., to Akzo N.V. Preparation of a printing ink binder. 4,087,483, Cl. 260-879.000.
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Mehta, Rustam J.; and Geilhufe, Michael, 4,087,704, Cl. 307-262.000.
Geluk, Ronald Jan, to N. V. Optische Industrie "De Oude Delft". X-ray picture coding. 4,087,837, Cl. 358-111.000.
Gendron, Aubrey Stewart; Ambrose, John; and Ettel, Victor Alexander, to International Nickel Company, Inc., The. Electrowinning of nickel in diaphragm-free cells. 4,087,338, Cl. 204-112.000.
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Kuffer, Fernand Bannie, 4,087,162, Cl. 350-299.000.
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Anderson, John M., 4,087,701, Cl. 307-149.000.
Bessen, Irwin I., 4,087,589, Cl. 428-596.000.
Bochan, John, 4,086,707, Cl. 34-48.000.
Budlane, Stanley J., 4,087,232, Cl. 431-66.000.
Carrico, Philip Hugh, 4,087,504, Cl. 264-89.000.
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Coggiola, James P., 4,086,714, Cl. 38-77.820.
Hemsworth, Martin C.; Corsmeier, Robert J.; and Hauser, Ambrose A., 4,087,199, Cl. 415-174.000.
Meek, Flora L.; and Hornung, Richard E., 4,086,813, Cl. 73-352.000.
Rhoades, John M., 4,087,731, Cl. 318-625.000.
Roberts, Edward H., 4,087,141, Cl. 312-320.000.
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Wu, Peter T. K.; and Viertl, John R. M., 4,086,809, Cl. 73-161.000.
General Foods Corporation: *See*—
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Kim, Myung Ki; and Lugay, Joaquin Castro, 4,087,566, Cl. 426-656.000.
General Motors Corporation: *See*—
Chana, Howard E., 4,086,827, Cl. 74-759.000.
Kochendorfer, Donald P.; and Hanson, Robert S., 4,086,785, Cl. 62-414.000.
Miller, Allan G.; Himka, John; and Patrick, Gerald L., 4,087,032, Cl. 224-42.230.
Riley, Michael W.; Duncan, Lane S.; and Bochmann, Carl E., 4,086,987, Cl. 192-58.00B.
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Smith, Gary L., 4,087,103, Cl. 280-96.100.
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George, William L.; and Wilson, Richard W., to Motorola, Inc. Bonding pedestals for semiconductor devices. 4,087,314, Cl. 156-643.000.
Gerber Products Company: *See*—
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Gernand, Martin O.; Maness, Dale D.; and Cull, Neville L., to Exxon Research & Engineering Co. Method for acid treating solid supports. 4,087,383, Cl. 252-463.000.
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Getty, Dorothy A.: *See*—
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Giacoppo, Guglielmo, to Societa Italiana Telecomunicazioni SIEMENS S.p.A. Modular connector for switching frame. 4,087,648, Cl. 179-98.000.
Gillilan, James. Power generating system. 4,086,765, Cl. 60-325.000.
Gilmore, Chace D. Automatic candle feeder. 4,087,236, Cl. 431-290.000.
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Golden, Ronald; Cohen, Allan H.; and Eby, David G., to Champion International Corporation. Color-developer coating for use in copy systems. 4,087,284, Cl. 106-21.000.

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Goodyear, Michael U.: *See—*
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Bayonnet, Jack L., 4,087,499, Cl. 264-40.700.
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Head, William J.; Kampinga, Erik R.; and Rodseth, John Kolbjorn, 4,087,306, Cl. 156-401.000.
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Mangun, Clifford O.; Brinkley, Max D.; and Appleby, Paul E., 4,087,298, Cl. 156-136.000.
Okuzumi, Yuzi, 4,087,439, Cl. 260-326.00N.
Parks, Carl R., 4,087,619, Cl. 560-104.000.
Payne, Roger E., 4,086,947, Cl. 152-175.000.
Tazuma, James J.; and Bergomi, Angelo, 4,087,477, Cl. 260-681.50R.
Touchette, John W.; and Appleby, Paul E., 4,087,305, Cl. 156-401.000.

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Gordy, Robert S.: *See—*
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Gorling, Karl Goran: *See—*
Edenwall, Ingvar A. O.; Ekman, Douglas Sewerin; Elvander, Hans I.; Gorling, Karl Goran; Hellestam, Carl Johan Sigvard; and Melkersson, Karl-Axel, 4,087,274, Cl. 75-10.00R.

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Masaki, Katsumi; and Goshima, Takeshi, 4,087,838, Cl. 358-199.000.

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Gozzo, Franco: *See—*
Piccardi, Paolo; Corda, Francesco; Gozzo, Franco; Longoni, Angelo; and Renis, Giovanni, 4,087,489, Cl. 260-949.000.

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Graco Inc.: *See—*
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Graham, David E.: *See—*
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Graham Magnetics Inc.: *See—*
Manly, William A., 4,087,842, Cl. 360-77.000.

Grant, David G.: *See—*
Garrison, John B.; Queen, James L.; and Grant, David G., 4,087,815, Cl. 343-9.000.

Grasso, Charles Paul: *See—*
Cross, Barrington; Grasso, Charles Paul; and Walworth, Bryant Leonidas, 4,087,612, Cl. 548-356.000.

Green, David Thomas; and McGarry, Richard A., to United States Surgical Corporation. Ligating and dividing organic structures. 4,086,926, Cl. 128-334.00R.

Greenfield, William D.: *See—*
Hall, Johnce E.; and Greenfield, William D., 4,086,971, Cl. 175-7.000.

Greenwood, Douglas: *See—*
Brookes, Robert Frederick; Godson, David Henry; Greenwood, Douglas; Tulley, Margaret; and Wakerley, Stanley Brice, 4,087,269, Cl. 71-92.000.

Gregory, Jerry L.; and Pitcher, Wayne H., Jr., to Corning Glass Works. Immobilization of enzymes using recycled support materials. 4,087,330, Cl. 426-68.000.

Greig, Richard C.: *See—*
Werner, Frank D.; and Greig, Richard C., 4,086,908, Cl. 126-270.000.

Greiner, James G.; Brelsford, John E.; and Shriver, Joe E., to Sperry Rand Corporation. Adjustable width row crop header. 4,086,749, Cl. 56-98.000.

Grenier, Aime J., to Texas Instruments Incorporated. Circuit breaker. 4,087,772, Cl. 335-202.000.

Greve, Manfred; and Moser, Helmut, to Sandoz Ltd. Dyeing and printing basic dyeable textile substrates with becationic disazo and trisazo dyes having optionally further substituted 6-hydroxy-4-methyl-3-N-pyridiniumpyridone-2-coupling component radicals. 4,087,244, Cl. 8-41.00R.

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Lowicki, Norbert; and Sidillo, Michael, 4,087,371, Cl. 252-180.000.

Grinberg, Alexandr Afroimovich: *See—*
Gurvich, Yakov Abramovich; Grinberg, Alexandr Afroimovich; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Starikova, Olga Fedorovna; Yanshevsky, Vladimir Avgustovich; Kumok, Simona Tevievna; Styskin, Evgeny Lvovich; and Rutman, Grigory Iosifich, 4,087,469, Cl. 568-723.000.

Grossi, Mario D.; and Cross, Robert K., to Raytheon Company. Electromagnetic lithosphere telemetry system. 4,087,781, Cl. 340-18.0NC.

Groves, James D., to Minnesota Mining and Manufacturing Company. Organotin catalyst system for isocyanate reactions. 4,087,412, Cl. 260-75.0NB.

Grumman Aerospace Corporation: *See—*
Gavin, Joseph G., 4,086,913, Cl. 126-271.000.

Grunert, Heinz: *See—*
Petzold, Manfred; Grunert, Heinz; and Becker, Klaus, 4,087,247, Cl. 8-169.000.

Grunwell, Joyce F.; and Petrow, Vladimir, to Richardson-Merrell Inc. Androst-4-en-19-ols for the enhancement of libido. 4,087,524, Cl. 424-238.000.

GTE Laboratories, Incorporated: *See—*
Marincic, Nikola; and Lombardi, Anthony, 4,087,594, Cl. 429-90.000.

GTE Sylvania Incorporated: *See—*
Ashley, Albert H., 4,087,762, Cl. 330-304.000.
Colville, William T.; Mecone, David W.; and Audesse, Emery G., 4,087,849, Cl. 362-13.000.
Shaffer, John W., 4,087,233, Cl. 431-95.00A.

Guichard, Jean-Marie: *See—*
Zabotto, Guy; Guichard, Jean-Marie; and Fournier, Daniel, 4,087,253, Cl. 23-297.000.

Guinosso, Charles J.: *See—*
Klaubert, Dieter H.; Sellstedt, John H.; and Guinosso, Charles J., 4,087,606, Cl. 544-163.000.

Gumm, Peter; and Witte, Horst, to Hoechst Aktiengesellschaft. Sheet conveyor mechanism for reproducing apparatus. 4,087,177, Cl. 355-47.000.

Gunderson, Richard A.: *See—*
Robert, Lawrence A.; and Gunderson, Richard A., 4,087,151, Cl. 339-176.0MP.

Gurgiolo, Arthur Emilio: *See—*
Baxter, Clyde Edward; and Gurgiolo, Arthur Emilio, 4,087,355, Cl. 208-330.000.

Gurvich, Yakov Abramovich; Grinberg, Alexandr Afroimovich; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Starikova, Olga Fedorovna; Yanshevsky, Vladimir Avgustovich; Kumok, Simona Tevievna; Styskin, Evgeny Lvovich; and Rutman, Grigory Iosifich. Method of producing 2,2 '-methylenebis(4,6-dialkylphenols). 4,087,469, Cl. 568-723.000.

Gutowski, Gerald E.: *See—*
Katner, Allen S.; Gutowski, Gerald E.; and Miller, Jean C., 4,087,429, Cl. 260-287.00B.

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Wiley, James Gordon, Jr., 4,087,013, Cl. 214-392.000.

H. J. Heinz Company: *See—*
Yao, Alden K.; and Segmiller, James L., 4,087,560, Cl. 426-250.000.

H. Koch & Sons: *See—*
Gaylord, John A., 4,086,685, Cl. 24-201.00R.

Haas, Edwin J. Aerosol can attachment. 4,087,027, Cl. 222-402.130.

Haas, Peter; and Koblischke, Klaus, to Standard Oil Company (Indiana). Process for improving the production efficiency of woven polypropylene fabrics. 4,087,507, Cl. 264-211.000.

Habdas, Edward P., to UOP Inc. Automotive oil cooler. 4,086,959, Cl. 165-155.000.

Haber, Raphael Ralph George; and Schonberger, Eva. 2'-(5'-Nitrofuryl)-substituted quinolines and process for preparing same. 4,087,427, Cl. 260-287.0AR.

Habert, Roger. Ignition system for internal combustion engines. 4,086,895, Cl. 123-148.00E.

Hackett, Homer L.: *See—*
Convers, Ronald J.; Fetzer, Paul L.; Hackett, Homer L.; and Starks, Charles M., 4,087,474, Cl. 260-652.00P.

Hadama, Shigeyuki, to Atsugi Motor Parts, Co., Ltd. Self-aligning reciprocating plunger pump. 4,087,213, Cl. 417-454.000.

Haeberle, Robert W., to EPP Corp. Pulsed electrical printer with dielectrically isolated electrode. 4,087,826, Cl. 346-155.000.
Haeder, Wolfgang, to Siemens Aktiengesellschaft. Cable sleeve with a clamping rail. 4,087,190, Cl. 403-313.000.
Haemonetics Corporation: *See—*
Latham, Allen, Jr., 4,086,924, Cl. 128-214.00R.
Hafeli, Robert, to Biomarine Handelsgesellschaft AG. Anti-fouling compositions. 4,087,597, Cl. 526-5.000.
Hafer, Edward Henry, to Bell Telephone Laboratories, Incorporated. Speech recognition system. 4,087,632, Cl. 179-1.0SD.
Hafke, Carl: *See—*
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Hageleit, Wolfgang: *See—*
Lesk, Adolf; and Hageleit, Wolfgang, 4,086,706, Cl. 34-33.000.
Hahn, Harry L. Device for brewing individual cups of coffee. 4,086,848, Cl. 99-323.000.
Hahn, Laurence W.: *See—*
Cornette, Earl B.; and Hahn, Laurence W., 4,086,695, Cl. 29-623.100.
Halcon International, Inc.: *See—*
Khoobiar, Sargis, 4,087,382, Cl. 252-455.00R.
Halem, Norman. Axial torsion pressure transducer. 4,087,662, Cl. 200-81.800.
Hall, Floyd Vanmeda, to Liggett Group Inc. Apparatus and method to sense and adjust the relative position of hollow tubes within a continuous filter. 4,086,846, Cl. 93-77.0FT.
Hall, Garth O.; Tengler, Harvey N.; and Shah, Narendra J., to UOP Inc. Suspension system for wide seat. 4,087,069, Cl. 248-400.000.
Hall, Johnce E.; and Greenfield, William D., to Standard Oil Company (Indiana). Riser pipe inserts. 4,086,971, Cl. 175-7.000.
Hall, Raymond L. Wall construction having panel attachment means. 4,086,739, Cl. 52-281.000.
Hall, Warren E., to Sports-Brella Inc. Umbrella shelter. 4,086,931, Cl. 135-20.00A.
Halm Instrument Co., Inc.: *See—*
Lyon, Floyd A.; and Harrison, Henry, 4,086,909, Cl. 126-270.000.
Hamada, Hideo; and Mizote, Masanori, to Nissan Motor Company, Limited. Clutch control apparatus for automotive driveline. 4,086,992, Cl. 192-.076.
Hamada, Mitsuo; Honma, Hiroshi; and Kato, Shoichi, to Toray Silicone Company, Ltd. Self-extinguishing silicone elastomer compositions. 4,087,399, Cl. 260-37.0SB.
Hamatani, Fumikazu, to Nippon Tsu Shin Kogyo K.K.; and TIE/Communications, Inc. Dial impulse relay circuit. 4,087,644, Cl. 179-16.00E.
Hamatani, Fumikazu: *See—*
Kerman, Stephen E.; Hamatani, Fumikazu; and Tsutsumi, Fumio, 4,087,649, Cl. 179-99.000.
Hamermesh, Charles L.; and Kaelble, David H., to Rockwell International Corporation. Lithographic dampener roll having rubber surfaces with increased wettability and method of making. 4,086,852, Cl. 101-147.000.
Hamill, Robert L.; and Nagarajan, Ramakrishnan, to Eli Lilly and Company. Antifungal antibiotics. 4,087,603, Cl. 536-26.000.
Hamisch, Paul H., Jr., to Monarch Marking Systems, Inc. Label printing and applying apparatus. 4,087,304, Cl. 156-384.000.
Hancock, Bruce J., to American Ionetics, Inc. Apparatus and method for supplying power to gas discharge lamp systems. 4,087,722, Cl. 315-200.00A.
Hancock, William L., to Hoover Ball and Bearing Company. Swivel chair with non-keywayed main screw. 4,087,070, Cl. 248-406.000.
Hancox, Roger John, to Accles and Shelvoke Limited. Device for use in the humane slaughtering of animals. 4,086,682, Cl. 17-1.00B.
Hanks, Rodney: *See—*
Aucoin, Ano J., Jr.; and Hanks, Rodney, 4,086,717, Cl. 43-6.500.
Hanrahan, James R., Jr.; and Levine, Richard G., to A.I.R. Industries, Inc. Therapeutic garment and method. 4,086,790, Cl. 66-178.00A.
Hansen, Kai Aage. Indicator for use in selection of bactericidal and bacteristatic drugs and method for producing same. 4,087,332, Cl. 195-127.000.
Hansen, Lloyd B.; and Smarrella, Eugene R., to Carmet Company. Method and apparatus for roof drilling. 4,086,972, Cl. 175-65.000.
Hansen, Robert: *See—*
Sherwin, Martin Barry; and Hansen, Robert, 4,087,623, Cl. 560-246.000.
Hanson, Paul B. Articulated bed. 4,086,673, Cl. 5-92.000.
Hanson, Robert S.: *See—*
Kochendorfer, Donald P.; and Hanson, Robert S., 4,086,785, Cl. 62-414.000.
Haraikawa, Tetsuo, to Tokico Ltd. Floating caliper-type disc brake. 4,086,986, Cl. 188-73.300.
Harboe, Henrik, to Stal-Laval Turbin AB. Combined steam and gas turbine plant and method of operation. 4,086,758, Cl. 60-39.020.
Hardie, George S.: *See—*
Maybell, Michael J.; and Hardie, George S., 4,087,822, Cl. 343-778.000.
Hardwick, Charles D.: *See—*
Barszczewski, Andrzej; and Hardwick, Charles D., 4,087,816, Cl. 343-105.00R.
Hareyama, Kyuichi, to Nippon Electric Co., Ltd. Reference voltage source circuit. 4,087,758, Cl. 330-261.000.
Harig, Richard Francis; Pietrusza, Arthur Jacob; Riebel, Albert Harry, Jr.; and Kent, Harry James, to Dravo Corporation. Seal arrangement for a rotary drum assembly. 4,087,334, Cl. 202-269.000.
Harima Sargyo Kabushiki Kaisha: *See—*
Yagi, Yutaka, 4,087,038, Cl. 228-112.000.
Harmon, Everette. Attachment for stapling gun. 4,087,035, Cl. 227-120.000.
Harris Corporation: *See—*
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Rogers, Walter McDowell, Jr., 4,087,756, Cl. 329-50.000.
Harrison, Andrew Peter: *See—*
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Hart, John S.: *See—*
Kuhn, Edward H.; and Hart, John S., 4,087,770, Cl. 335-132.000.
Harte, Kevin Michael, to Chemische Industrie Randstad, N.V. Folic acid animal feed materials and processes. 4,087,556, Cl. 426-2.000.
Hartenstein, Johannes: *See—*
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Hartmann, Heinrich; Druschke, Wolfgang; Eisentraeger, Klaus; and Mueller, Helmut, to BASF Aktiengesellschaft. Manufacture of pressure-sensitive adhesives. 4,087,392, Cl. 260-24.000.
Hasegawa, Harumi: *See—*
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Hasegawa, Koichi: *See—*
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Hasegawa, Tsutomu: *See—*
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Hatzakis, Michael, to International Business Machines Corporation. Prebaking treatment for resist mask composition and mask making process using same. 4,087,569, Cl. 427-43.000.
Hatzakis, Michael: *See—*
Canavello, Benjamin John; Hatzakis, Michael; Siegel, Arthur Richard; and Watters, Connell, 4,086,870, Cl. 118-52.000.
Haugen, Ronald L., to Ingersoll-Rand Company. Gas compressor, and for use with a gas compressor: gear housing and gas-handling assembly, and heat exchanging assembly. 4,087,197, Cl. 415-66.000.
Hauser, Ambrose A.: *See—*
Hemsworth, Martin C.; Corsmeier, Robert J.; and Hauser, Ambrose A., 4,087,199, Cl. 415-174.000.
Hauser, Henry K. Impact deflection absorber and stabilizer. 4,087,085, Cl. 267-135.000.
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Hawley Manufacturing Corporation: *See—*
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Hayakawa, Koji: *See—*
Okamoto, Tomiyasu; Nishimoto, Tsunanori; Sawada, Kaoru; Hayakawa, Koji; and Kurihara, Tomomichi, 4,087,017, Cl. 220-445.000.
Hayashi, Masaki; Kori, Seiji; Ohyama, Isao; Iguchi, Sadahiko; and Okada, Takanori, to Ono Pharmaceutical Company. 15-Cycloalkyl-prostaglandin derivatives. 4,087,620, Cl. 560-121.000.
Hayashi, Muriyoshi, to Yoshida Kogyo K.K. Adjustable-height baseboard for partitions. 4,086,734, Cl. 52-122.000.
Haydock, David Bryan; and Smithers, Michael James, to Imperial Chemical Industries Limited. Method for improving growth rate and feed efficiency. 4,087,554, Cl. 424-353.000.
Haydon, Arthur W., to Tri-Tech, Inc. Electric rotating machine. 4,087,709, Cl. 310-83.000.
Hayes, James Christopher; and Tunzi, Burton Ralph, to Telaris Telecommunications Inc. DTMF Communication system. 4,087,638, Cl. 179-2.00E.
Hayes, John C. Dehydrogenation method. 4,087,476, Cl. 260-668.00D.
Haynes, Charles A. Apparatus for hydrocarbon recovery from earth strata. 4,086,960, Cl. 166-59.000.
Hays, Lance G., to Biphase Engines, Inc. Multi-phase separator. 4,087,261, Cl. 55-41.000.
Hazeltine Corporation: *See—*
La Rosa, Richard; and Aiello, Gerald A., 4,087,714, Cl. 310-313.000.
Head, William J.; Kampinga, Erik R.; and Rodseth, John Kolbjorn, to Goodyear Tire & Rubber Company, The. Turn-up or turn-over bladder for tire building machines. 4,087,306, Cl. 156-401.000.
Head, William J.; and von der Heyde, Richard Carl, to Goodyear Tire & Rubber Company, The. Inflatable bladder for a tire building drum. 4,087,307, Cl. 156-401.000.
Heaney, James J., to Anthony's Manufacturing Company, Inc. Guide for fastener. 4,087,139, Cl. 312-138.00R.
Heard, Kenneth E.: *See—*
Schoonover, Alan G.; Ericksen, Gary E.; and Heard, Kenneth E., 4,086,887, Cl. 123-90.390.
Hechler, Valentine, IV. Dual hose. 4,086,937, Cl. 137-559.000.
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Heider, Wolfgang; Heiland, Hans; and Schroetter, Wolfgang Adalbert, to Bunker Ramo Corporation. Double-throw contact. 4,087,667, Cl. 200-245.000.

Heiland, Hans; and Seyfferle, Otto, to Bayerische Motoren Werke Aktiengesellschaft. Suspension installation for an exhaust gas system. 4,086,977, Cl. 180-64.00A.
Heiland, Hans: *See*—
Heider, Wolfgang; Heiland, Hans; and Schroetter, Wolfgang Adalbert, 4,087,667, Cl. 200-245.000.
Hein-Werner Corporation: *See*—
Suechting, William G., 4,087,210, Cl. 417-401.000.
Heinrich, Ernst; Ribka, Jachim; and Valentin, Joachim, to Cassella Farbwerke Mainkur Aktiengesellschaft. Azo dyestuffs containing an α-phenylamino isobutyric acid alkyl ester coupling component. 4,087,420, Cl. 260-207.000.
Heintz, Frieder: *See*—
Zabler, Erich; Heintz, Frieder; and Kopernik, Viktor, 4,087,804, Cl. 340-319.000.
Heintz, Richard P. Free-piston engine-pump unit. 4,087,205, Cl. 417-11.000.
Heldt, Wolfgang: *See*—
Satzinger, Gerhard; Hartenstein, Johannes; Herrmann, Manfred; and Heldt, Wolfgang, 4,087,544, Cl. 424-305.000.
Helena Rubinstein, Inc.: *See*—
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Hellestam, Carl Johan Sigvard: *See*—
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Hellstrom, Melbourne J.; Bunch, Laverne R.; and Froger, Henri, to CGR Medical Corporation. Tomography system. 4,087,694, Cl. 250-445.00T.
Hellwig, Oskar Alexander, to Beatrice Foods Co. Key case head. 4,086,796, Cl. 70-456.00B.
Hemsworth, Martin C.; Corsmeier, Robert J.; and Hauser, Ambrose A., to General Electric Company. Ceramic turbine shroud assembly. 4,087,199, Cl. 415-174.000.
Henderson, Albert L. Collapsible-helix antenna. 4,087,820, Cl. 343-752.000.
Henderson, Burnis. Method and apparatus for treating cellulite containing areas of the human body. 4,086,922, Cl. 128-24.300.
Hendrickson, Thomas C., to Colgate-Palmolive Company. Scrim reinforced plastic film. 4,087,577, Cl. 428-110.000.
Hengst, Alfred, to Ernst Leitz GmbH. Binoculars with double hinge bridge and resilient biasing. 4,087,153, Cl. 350-76.000.
Henkel, Hans-Joachim; and De Bucs, Eugen Szabo, to Siemens Aktiengesellschaft. Method of operating an internal combustion engine fed with a reformed gas. 4,086,877, Cl. 123-1.00A.
Henkel Kommanditgesellschaft auf Aktien: *See*—
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Heyden, Rudi; Asbeck, Adolf; and Eckelt, Michael, 4,087,398, Cl. 260-29.60R.
Henkin, Melvyn Lane. Altitude conditioning method and apparatus. 4,086,923, Cl. 128-140.00R.
Hennen, Hans: *See*—
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Hennet, Peter P.: *See*—
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Hepworth, Edward C.: *See*—
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Hercules Incorporated: *See*—
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Herndon, Lee R., Jr., to Vega Servo Control, Inc. Display monitor for computer numerical control systems. 4,087,808, Cl. 340-324.0AD.
Hernick, Jack Frank. Apparatus for supporting an automobile at an elevation. 4,086,982, Cl. 187-8.540.
Herrmann, Manfred: *See*—
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Hertel, Karl. Cutting tool bit. 4,087,192, Cl. 407-114.000.
Hessler, Norman F., to UOP Inc. Integrated heat exchange on crude oil and vacuum columns. 4,087,354, Cl. 208-251.00R.
Hestad, Alfred Magnus. Telephone switching system. 4,087,645, Cl. 179-18.0FA.
Hester, Donald Larry: *See*—
Blum, Frederick David; Hester, Donald Larry; and Peoples, John Terrance, 4,087,656, Cl. 179-175.30R.
Heubach, Gunther, to Hoechst Aktiengesellschaft. 5-Methyl-isoxazole-4-carboxylic acid anilides. 4,087,535, Cl. 424-272.000.
Heyden, Rudi; Asbeck, Adolf; and Eckelt, Michael, to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA). Antifoam compositions. 4,087,398, Cl. 260-29.60R.
Heywang, Walter, to Siemens Aktiengesellschaft. Multi-layer element consisting of piezoelectric ceramic laminations and method of making same. 4,087,716, Cl. 310-332.000.
Hicks, Donald L.; and Doerr, Richard D., to ACF Industries, Inc. Throttle structure for imparting supersonic characteristics in the intake manifold of an internal combustion engine. 4,086,896, Cl. 123-122.0AC.
Hill, Harold J.: *See*—
Dilgren, Richard E.; Hirasaki, George J.; Hill, Harold J.; and Whitten, Derrill G., 4,086,964, Cl. 166-272.000.
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Hino, Hajime; Sasaki, Yoshiyuki; Sekiguthi, Toshio; and Yao, Masaaki, to Teijin Limited. Process for producing a fused false twisted continuous filament yarn having crispness characteristics of hard high-twist yarn. 4,086,751, Cl. 57-157.0TS.
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Dilgren, Richard E.; Hirasaki, George J.; Hill, Harold J.; and Whitten, Derrill G., 4,086,964, Cl. 166-272.000.
Hirosawa, Koichiro; Ogasahara, Tsunehiko; Ishikawa, Kazuo; and Murakami, Noboru, to Aisin Seiki Kabushiki Kaisha. Fluid pressure modulating apparatus for a fluidically actuated frictional engaging apparatus in a vehicle transmission. 4,086,994, Cl. 192-109.00F.
Hirose, Hideshi: *See*—
Kozuka, Goro; Matsui, Akira; Yoshida, Yoshiaki; Fujimoto, Katsuhiko; Okada, Shigeo; Nonoyama, Seiji; Kato, Yukihiko; and Hirose, Hideshi, 4,087,083, Cl. 266-273.000.
Hirsch, Don J. Microphone switch key. 4,087,652, Cl. 179-147.000.
Hiss, William K. Automatic transmission torque converter flusher. 4,086,930, Cl. 134-168.00R.
Hitachi, Ltd.: *See*—
Horiuchi, Michimasa; and Narita, Hiroshi, 4,087,727, Cl. 318-376.000.
Joraku, Masami; Yamauchi, Koji; Kawano, Shigeyoshi; and Ueno, Masahiro, 4,087,078, Cl. 254-173.00R.
Hitachi Shipbuilding & Engineering Co., Ltd.: *See*—
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Okamoto, Tomiyasu; Nishimoto, Tsunanori; Sawada, Kaoru; Hayakawa, Koji; and Kurihara, Tomomichi, 4,087,017, Cl. 220-445.000.
Hitchcock, Robert A. Fire shield for electrical box. 4,087,624, Cl. 174-57.000.
Hitco: *See*—
Shaffer, Robert C., 4,087,482, Cl. 260-868.000.
Hobart Corporation: *See*—
Churley, George, 4,086,938, Cl. 137-586.000.
Focht, Ronald E., 4,086,929, Cl. 134-56.00D.
Hodges, Robert J., to International Standard Electric Corporation. Helical spring optical fiber connector and splice. 4,087,157, Cl. 350-96.210.
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Corporation. Decaffeination of green coffee. 4,087,562, Cl. 426-428.000.
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K-D Manufacturing Company: *See—*
Mader, William G., 4,086,828, Cl. 81-3.00K.
Kabushiki Kaisha Daini Seikosha: *See—*
Ikuta, Yasuo, 4,086,696, Cl. 29-627.000.
Kishimoto, Hiroo, 4,086,752, Cl. 58-23.00R.
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Sato, Yo, 4,087,057, Cl. 242-68.300.
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Tsuchiya, Hideo; and Kitai, Kiyoshi, 4,086,753, Cl. 58-23.00D.
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Futagawa, Yoshikiyo; and Kuriya, Katsumi, 4,087,861, Cl. 364-709.000.
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Shinoda, Akibumi; and Shimizu, Masahiko, 4,087,707, Cl. 310-63.000.
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Eberlein, Wolfgang; Kutter, Eberhard; Heider, Joachim; Austel, Volkhard; Kadatz, Rudolf; Diederen, Willi; Kobinger, Walter; Lillie, Christian; and Dammgen, Jurgen, 4,087,541, Cl. 424-274.000.
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Hamermesh, Charles L.; and Kaelble, David H., 4,086,852, Cl. 101-147.000.
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Kanae, Yoshioki, to Agency of Industrial Science & Technology. Method for determination of optical anisotropy of dielectric material by microwave. 4,087,746, Cl. 324-58.50A.
Kanegae, Hidetoshi; and Hosaka, Akio, to Nissan Motor Company, Limited. Vapor temperature/pressure control system for an automotive vapor-powered engine. 4,086,773, Cl. 60-664.000.
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Inamoto, Yoshiaki; Fujikura, Yoshiaki; and Ikeda, Hiroshi, 4,087,467, Cl. 568-817.000.
Kaplansky, Arkady Fridmanovich: *See—*
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Scott, Howard L., 4,087,517, Cl. 424-69.000.
Karstensen, Karl W.; and Meints, Edward G., to Caterpillar Tractor Co. Gas turbine cooling system. 4,086,757, Cl. 60-39.16R.
Karstensen, Karl W.; Thompson, LeRoy R.; and Wenninger, James F., to Caterpillar Tractor Co. Gas turbine shaft and bearing assembly. 4,086,759, Cl. 60-39.080.
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Williams, Robert L., 4,086,741, Cl. 53-12.000.
Kashio, Toshio, to Casio Computer Co., Ltd. Storage reconfiguration apparatus. 4,087,853, Cl. 364-200.000.
Katner, Allen S.; Gutowski, Gerald E.; and Miller, Jean C., to Eli Lilly and Company. 5′ Acetoxy vinblastine 4′ bis-sulfite. 4,087,429, Cl. 260-287.00B.
Kato, Hiroshi, to Sakura Denki Kabushiki Kaisha. Vibration absorbing device for portable vibrators. 4,086,970, Cl. 173-162.000.
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Katz, Daniel Stanley, to American Cyanamid Company. Liquid slurry of submicron particles of hexabromobenzene, and process of manufacture. 4,087,364, Cl. 252-8.100.
Kawahara, Haruyuki; and Hirabayashi, Masaya, to Kyoto Ceramic Kabushiki Kaisha. Device for implanting an artificial endosseous element of ceramics and an implant method for use of the same. 4,086,701, Cl. 32-10.00A.
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Keen, Ralph Otto, to Taper Line, Incorporated. Locking nut. 4,086,946, Cl. 151-21.00C.
Keene Corporation: *See—*
Silvestris, Louis F.; and Silverman, Arthur, 4,087,147, Cl. 339-21.00R.
Keil, Joseph W., to Dow Corning Corporation. Siloxane copolymers and thread finisher prepared therewith. 4,087,478, Cl. 260-825.000.
Keller, Hansjurg, to Cerberus AG. Infrared radiation-burglary detector. 4,087,688, Cl. 250-342.000.
Keller Spezialtechnik-Pyro Werk GmbH: *See—*
Kinderling, Eckart; Erauw, Herwig; Rudolf, Alfons; and Klintworth, Helmut, 4,086,805, Cl. 73-359.00R.
Keller, Wilbur S.; and Langford, James Wilson, Jr., to Dresser Industries, Inc. Asymmetric insert for inner row of an earth boring cutter. 4,086,973, Cl. 175-374.000.
Kelly, Eric L., to Purex Corporation. Caster mount assembly. 4,086,680, Cl. 16-30.000.
Kelso, Kenneth J. Moving artificial ski surface construction. 4,087,088, Cl. 272-56.5SS.
Kelyman, Jacqueline S., to Dow Chemical Company, The. Crosslinked, linear, acylated polyalkylenepolyamines and process therefor. 4,087,413, Cl. 260-77.5CH.
Kennedy, Thomas A., Jr.; and McCombe, Bruce D., to United States of America, Navy. Technique for contactless characterization of semiconducting material and device structures. 4,087,745, Cl. 324-58.00B.
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Monte, Salvatore J.; and Sugerman, Gerald, 4,087,402, Cl. 260-42.140.
Kent, Alan Walter: *See—*
Figov, Murray; Kent, Alan Walter; Stephenson, Raymond Owen; and Watts, Peter Edward, 4,086,853, Cl. 101-463.000.
Kent, Harry James: *See—*
Harig, Richard Francis; Pietrusza, Arthur Jacob; Riebel, Albert Harry, Jr.; and Kent, Harry James, 4,087,334, Cl. 202-269.000.
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Kerman, Stephen E.; Hamatani, Fumikazu; and Tsutsumi, Fumio, to Nippon Tsu Shin Kogyo K.K.; and TIE/Communications, Inc. Pulse counting circuit. 4,087,649, Cl. 179-99.000.
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Deegen, Axel W.; and Kessler, Michael J., 4,087,747, Cl. 324-72.500.
Ketterer, Stanley Joseph; and Adams, Kenneth Douglas, to Singer

Company, The. Electro-mechanical actuator. 4,086,861, Cl. 112-158.00E.
Kewanee Industries, Inc.: *See—*
Merianos, John J., 4,087,451, Cl. 260-454.000.
Khoo, Sian W., to Canadian Gas Research Institute. Hot water heater corrosion detector probe. 4,087,742, Cl. 324-29.000.
Khoobiar, Sargis, to Halcon International, Inc. Catalyst. 4,087,382, Cl. 252-455.00R.
Kiemer, Ralph Frederick: *See—*
Baugher, Robert Charles; Bond, Robert Henry; Immel, Walter William, Sr.; and Kiemer, Ralph Frederick, 4,087,308, Cl. 156-405.00R.
Kienzle, Frank: *See—*
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,087,488, Cl. 260-940.000.
Kiilunen, Matt, to Weld Mold Company. Method of welding and electrode therefore. 4,087,673, Cl. 219-137.0WM.
Kikkawa, Yoshio; and Namiki, Shigeru, to Matsushita Electric Industrial Co., Ltd. Automatic component mounting apparatus. 4,087,034, Cl. 227-90.000.
Kikuchi, Makoto; and Otsu, Ikuo, to Toyoda Koki Kabushiki Kaisha. Feed amount setting device for a machine tool. 4,086,729, Cl. 51-165.800.
Kikuchi, Yoshinobu: *See—*
Yamada, Akitoshi; Kimura, Yoichi; and Kikuchi, Yoshinobu, 4,087,631, Cl. 179-1.00G.
Kilbourn, Edward E.: *See—*
Aller, Harold E.; Kilbourn, Edward E.; Weiler, Ernest D.; and Weir, William D., 4,087,521, Cl. 424-211.000.
Kilroy, Joseph Anthony: *See—*
Danahy, Thomas Michael; and Kilroy, Joseph Anthony, 4,087,320, Cl. 162-252.000.
Kim, Myung Ki; and Lugay, Joaquin Castro, to General Foods Corporation. Fibrous protein materials. 4,087,566, Cl. 426-656.000.
Kimura, Kiyoshi: *See—*
Morita, Sizuo; Thuchiya, Hiroshi; and Kimura, Kiyoshi, 4,086,873, Cl. 118-658.000.
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Kinderling, Eckart; Erauw, Herwig; Rudolf, Alfons; and Klintworth, Helmut, to Keller Spezialtechnik-Pyro Werk GmbH. Apparatus for evaluating measurement signals. 4,086,805, Cl. 73-359.00R.
Kinoshita, Katsutoshi: *See—*
Takahashi, Choku; and Kinoshita, Katsutoshi, 4,087,844, Cl. 360-96.000.
Kinoshita, Tsuneo; and Sato, Kazuyuki, to Tokyo Shibaura Electric Co., Ltd. Minicomputer system with an arithmetic control unit integrated on a one-chip semiconductor device. 4,087,854, Cl. 364-200.000.
Kinsinger, William C.; and Ippolito, James, to Metagraphic Systems, Inc. Apparatus for viewing a preselected one of a plurality of media stored in a container. 4,087,005, Cl. 209-80.500.
Kirby, James P.; Dudley, Peggy D.; and Schwendner, David A. Digital electronic dimmer. 4,087,702, Cl. 307-252.00B.
Kirkwood, Kenneth Clark: *See—*
Hyde, David Leslie; and Kirkwood, Kenneth Clark, 4,087,380, Cl. 252-429.00B.
Kirtley, James L., Jr.; and Smith, Joseph L., Jr., to Massachusetts Institute of Technology. Rotating electric machine having a toroidal-winding armature. 4,087,711, Cl. 310-184.000.
Kirton, Douglas Chater: *See—*
Poot, Cornelis; Verburg, Charles Cornelis; Kirton, Douglas Chater; and MacNeill, Avril Brown, 4,087,564, Cl. 426-603.000.
Kishimoto, Hiroo, to Kabushiki Kaisha Daini Seikosha. Electronic timepiece. 4,086,752, Cl. 58-23.00R.
Kitahara, Osamu: *See—*
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Kitahara, Tomohiro, to Olympus Optical Co., Ltd. Electrophoretic apparatus. 4,087,346, Cl. 204-299.00R.
Kitai, Kiyoshi: *See—*
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Kitamoto, Tatsuji: *See—*
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Klaiber, Erich Manfred: *See—*
Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, 4,086,927, Cl. 131-17.00R.
Klaubert, Dieter H.; Sellstedt, John H.; and Guinosso, Charles J., to American Home Products Corporation. 2-Cyano-3- or 4-(substituted amino)oxanilic acid derivatives. 4,087,606, Cl. 544-163.000.
Klauke, Erich: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert R., 4,087,272, Cl. 71-120.000.
Klautschek, Herwig, to Siemens Aktiengesellschaft. Circuit arrangement for supplying an inductive load. 4,087,851, Cl. 363-96.000.
Kleef, Jan A.; and Doorenbos, Sytze M., to Hoogovens Ijmuiden, B.V. Device for exchanging and/or repairing the down spout and seating brick in a steel ladle. 4,087,082, Cl. 266-281.000.
Klein, Philipp H.: *See—*
Schneider, Irwin; Collins, William C.; Imber, Oscar; and Klein, Philipp H., 4,087,374, Cl. 252-300.000.
Klintworth, Helmut: *See—*
Kinderling, Eckart; Erauw, Herwig; Rudolf, Alfons; and Klintworth, Helmut, 4,086,805, Cl. 73-359.00R.
Kloss, Wolfgang: *See—*
Sauer, Hans; and Kloss, Wolfgang, 4,087,596, Cl. 429-209.000.
Kluge, Arthur F.: *See—*
Muchowski, Joseph M.; and Kluge, Arthur F., 4,087,539, Cl. 424-274.000.
Knap, George. Orbital propulsion apparatus. 4,087,064, Cl. 244-172.000.
Knapp, Julius Z.; and Zeiss, John C., to Schering Corporation. Method and apparatus for inspecting liquids in transparent containers. 4,087,184, Cl. 356-197.000.
Knaus, Dennis: *See—*
Bambara, John D.; and Knaus, Dennis, 4,087,002, Cl. 206-523.000.
Knight, William E. Backpack frame-borne carrier for a patient or other loads. 4,087,030, Cl. 224-6.000.
Knofel, Hartmut; and Ellendt, Gunther, to Bayer Aktiengesellschaft. Process for the preparation of polyamines. 4,087,459, Cl. 260-570.00D.
Kobayashi, Akiyoshi; and Fukada, Kenshi, to Toyoda Koki Kabushiki Kaisha. Feed apparatus for table of machine tool. 4,086,730, Cl. 51-165.900.
Kobayashi, Yuji: *See—*
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Kobinger, Walter: *See—*
Eberlein, Wolfgang; Kutter, Eberhard; Heider, Joachim; Austel, Volkhard; Kadatz, Rudolf; Diederen, Willi; Kobinger, Walter; Lillie, Christian; and Dammgen, Jurgen, 4,087,541, Cl. 424-274.000.
Koblischke, Klaus: *See—*
Haas, Peter; and Koblischke, Klaus, 4,087,507, Cl. 264-211.000.
Koch, Franklin O., Jr., to Caterpillar Tractor Co. Transmission overspeed inhibitor. 4,086,993, Cl. 192-104.00F.
Koch, Wilhelm, to Brown, Boveri and Cie AG. Device for transmitting force from one shaft to another. 4,086,787, Cl. 64-10.000.
Kochendorfer, Donald P.; and Hanson, Robert S., to General Motors Corporation. Two-piece fan motor mounting arrangement. 4,086,785, Cl. 62-414.000.
Koda, Masuo. Pneumatic record player. 4,087,095, Cl. 274-9.00R.
Kodama, Yutaka: *See—*
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,087,424, Cl. 260-268.00C.
Koehring Company: *See—*
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Koester, George L., Jr., to Hynes Electric Heating Company. Electronic level switch control setup. 4,087,706, Cl. 307-308.000.
Kofsky, Harvey I.; and Warner, Glenfield, to Kofsky, Harvey I.; Warner, Glenfield; and Schwartz, Harry. Ear oximetry process and apparatus. 4,086,915, Cl. 128-2.00L.
Kohira, Kazumaru; Aoki, Shiro; and Nagatani, Taizi, to Nippon Steel Corporation. Steel wire for gas shielded welding. 4,087,674, Cl. 219-146.100.
Kohler, Ernst Jurgen: *See—*
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Bahker, Friedrich; and Kohler, Ernst Jurgen, 4,087,067, Cl. 246-167.00R.
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Koizumi, Akio, to Sony Corporation. Power supply circuit. 4,087,850, Cl. 363-21.000.
Kolm, Georg. Connector arrangement. 4,087,152, Cl. 339-252.00R.
Kolodziej, Henry W. Illuminating device. 4,087,682, Cl. 362-297.000.
Kolombos, Alexander John; McNeice, Donald; and Wood, Dennis Charles, to British Petroleum Company Limited, The. Olefins production by steam cracking over manganese catalyst. 4,087,350, Cl. 208-121.000.
Komatsu, Miwako: *See—*
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,087,424, Cl. 260-268.00C.
Komiya, Kunihiko: *See—*
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Konishiroku Photo Industry Co., Ltd.: *See—*
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Konno, Koji: *See—*
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Kopernik, Viktor: *See—*
Zabler, Erich; Heintz, Frieder; and Kopernik, Viktor, 4,087,804, Cl. 340-319.000.
Kopietz, Karl-Heinz; and Munjat, Francis S., to E. F. Houghton & Co. Process for the controlled cooling of ferrous metal. 4,087,290, Cl. 148-18.000.
Korenblit, Izya Yakovlevich; Kaplansky, Arkady Fridmanovich; Ark-

hipov, Vladimir Viktorovich; Frenkel, Andrei Filippovich; and Sarychev, Jury Pavlovich. Stator of multistage centrifugal compressor. 4,087,200, Cl. 415-199.200.

Kori, Seiji: *See*—
Hayashi, Masaki; Kori, Seiji; Ohyama, Isao; Iguchi, Sadahiko; and Okada, Takanori, 4,087,620, Cl. 560-121.000.

Korst, James J.: *See*—
Cronin, Timothy H.; Faubl, Hermann; Hoffman, William W.; and Korst, James J., 4,087,552, Cl. 424-330.000.

Korytko, Myron I., to Efco, Inc. Apparatus for shearing a workpiece such as a metal bar or the like. 4,086,832, Cl. 83-198.000.

Kosrow, Robert L.; and Bohl, Alfred W., to Union Special Corporation. Edge alignment apparatus. 4,086,860, Cl. 112-153.000.

Koss, Kurt. Apparatus for building a concrete bridge superstructure. 4,087,220, Cl. 425-63.000.

Kozuka, Goro; Matsui, Akira; Yoshida, Yoshiaki; Fujimoto, Katsuhiko; Okada, Shigeo; Nonoyama, Seiji; Kato, Yukihiko; and Hirose, Hideshi, to A. Daidoseiko K.K.; and B. Denkikagakukogyo K.K. Manipulator. 4,087,083, Cl. 266-273.000.

Kozuka, Hajime: *See*—
Yoshida, Hiroshi; and Kozuka, Hajime, 4,086,940, Cl. 137-625.690.

Kraft, Dennis W., to United States of America, Navy. Pressure-equalized electrochemical battery system. 4,087,590, Cl. 429-6.000.

Krakauer, Merrill. Article vending machine having rotary storage compartments. 4,087,020, Cl. 221-84.000.

Krakinowski, Morris: *See*—
Dym, Herbert; and Krakinowski, Morris, 4,087,625, Cl. 178-19.000.

Kraklau, David M. Shot sleeve. 4,086,953, Cl. 164-312.000.

Kramer, Erich; and Bleck, Wolf Eckhard, to Bayer Aktiengesellschaft. Process for the preparation of concentrated solutions of anionic dyestuffs. 4,087,245, Cl. 8-85.00A.

Kramer, Walter. Mixing apparatus. 4,087,079, Cl. 366-131.000.

Kraus, Charles E.; and Kraus, James Hume, to Excelermatic, Inc. Infinitely variable traction roller transmission. 4,086,820, Cl. 74-200.000.

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Kraus, Charles E.; and Kraus, James Hume, 4,086,820, Cl. 74-200.000.

Krause, John D.; and Colditz, Eugene F., to Kaiser Aerospace & Electronics Corporation. Aircraft toilet drain assembly. 4,086,670, Cl. 4-295.000.

Krause, Stephen R.; Goldman, Max; and Gnat, Emanuel, to Tele Vend Inc.; and SOI, part interest to each. Random generator instant game and method. 4,087,092, Cl. 273-138.00A.

Kreutel, Randall William, Jr., to Communications Satellite Corporation. Lossless network and method for orthogonalizing dual polarized transmission systems. 4,087,818, Cl. 343-176.000.

Krivakova, Miroslava: *See*—
Wichterle, Otto; Coupek, Jiri; and Krivakova, Miroslava, 4,087,598, Cl. 526-16.000.

Kriz, Miroslav, to Lucas Industries Limited. Fuel pumping apparatus. 4,086,898, Cl. 123-140.0MP.

Kronmiller, George John. Apparatus for deriving energy from moving gas streams. 4,087,196, Cl. 415-2.000.

Krueger, Keith T.: *See*—
Di Marco, Bernard; and Krueger, Keith T., 4,087,769, Cl. 335-16.000.

Krupke, William F.: *See*—
George, E. Victor; Krupke, William F.; Murray, John R.; Powell, Howard T.; Swingle, James C.; Turner, Charles E., Jr.; and Rhodes, Charles K., 4,087,763, Cl. 331-94.5PE.

Ku, Katharine: *See*—
Feder, Joseph; Ku, Katharine; and Kuo, Mau-Jung, 4,087,327, Cl. 195-1.700.

Kubik, Peter Steve, to Bell Telephone Laboratories, Incorporated. Quick connect wiring system for breadboard circuits. 4,087,150, Cl. 339-97.00P.

Kuffer, Fernand Bannie, to General Dynamics Corporation. Full power optical system with displaced beam parts. 4,087,162, Cl. 350-299.000.

Kuhn, Edward H.; and Hart, John S., to Allen-Bradley Company. Industrial relay. 4,087,770, Cl. 335-132.000.

Kuhn, Franz Josef: *See*—
Langbein, Adolf; Walther, Gerhard; Danneberg, Peter; and Kuhn, Franz Josef, 4,087,531, Cl. 424-267.000.

Kume, Toshiaki: *See*—
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Kumok, Simona Tevievna: *See*—
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Masaki, Katsumi; and Goshima, Takeshi, to Canon Kabushiki Kaisha. Apparatus for obtaining a light carrying information therewith. 4,087,838, Cl. 358-199.000.
Maschinenfabrik Becker & Co. Kg: *See*—
Becker, Hans-Werner; and Oberlander, Werner, 4,086,850, Cl. 100-42.000.
Masclet, Jean, to Messier-Hispano, S.A. Aircraft undercarriage including a safety device having a predetermined breaking load. 4,087,062, Cl. 244-100.00R.
Massachusetts Institute of Technology: *See*—
Kirtley, James L., Jr.; and Smith, Joseph L., Jr., 4,087,711, Cl. 310-184.000.
Pratt, George W., Jr., 4,087,719, Cl. 315-45.000.
Massey, Alan William, to Post Office, The. Cable terminating and testing unit. 4,087,655, Cl. 179-175.000.
Massey-Ferguson Inc.: *See*—
Profenna, Leonardo C.; and Campbell, James L., 4,087,009, Cl. 214-131.00A.
Massey, Roger G.; and Holloway, David G., to Parker & Harper Mfg. Co., Inc., The. Spring return valve actuator. 4,087,074, Cl. 251-58.000.
Mast, Roy Clark: *See*—
Garrison, Charles Michael; Mast, Roy Clark; and Robbins, Medford Dwight, 4,087,273, Cl. 71-100.000.
Mathys, Wilbur L.: *See*—
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,087,855, Cl. 364-200.000.
Matla, Arno: *See*—
Louis, Helmut P.; Matla, Arno; Schaller, Karl Heinz; and Zimmerman, Volker, 4,087,843, Cl. 360-78.000.
Matsubayashi, Kenichi: *See*—
Tsubuko, Kazuo; Matsubayashi, Kenichi; and Kurotori, Tsuneo, 4,087,393, Cl. 260-27.00R.

Matsui, Akira: *See—*
Kozuka, Goro; Matsui, Akira; Yoshida, Yoshiaki; Fujimoto, Katsuhiko; Okada, Shigeo; Nonoyama, Seiji; Kato, Yukihiko; and Hirose, Hideshi, 4,087,083, Cl. 266-273.000.

Matsui, Teruyoshi: *See—*
Fukumoto, Nobuo; Ohiwa, Mitsugo; Matsui, Teruyoshi; and Ohta, Hajime, 4,087,761, Cl. 330-267.000.

Matsui, Toshiie: *See—*
Aiba, Hiroaki; Matsui, Toshiie; and Yoshida, Shu, 4,087,182, Cl. 355-100.000.

Matsumoto, Yoshio: *See—*
Sugimoto, Masaaki; Matsumoto, Yoshio; Ikeya, Nobushige; and Hasegawa, Koichi, 4,087,505, Cl. 264-95.000.

Matsuo, Yoshio: *See—*
Kato, Yasuo; and Matsuo, Yoshio, 4,087,751, Cl. 325-24.000.

Matsushita Electric Industrial Co., Ltd.: *See—*
Atoji, Nobuhisa; and Aoi, Takahisa, 4,087,629, Cl. 179-1.00G.
Kikkawa, Yoshio; and Namiki, Shigeru, 4,087,034, Cl. 227-90.000.
Yamada, Akitoshi; Kimura, Yoichi; and Kikuchi, Yoshinobu, 4,087,631, Cl. 179-1.00G.

Matsushita, Toshiaki; and Shibata, Yukio, to Fuji Jukogyo Kabushiki Kaisha. Thermal reactor system for internal combustion engine. 4,086,763, Cl. 60-282.000.

Matsuura, Toshiharu: *See—*
Tamura, Tetsuomi; Mizutani, Koichi; and Matsuura, Toshiharu, 4,086,897, Cl. 123-136.000.

Matthews, Russell Byron, to Johnson Controls, Inc. Stack damper control safety interlock with lockout prevention. 4,087,045, Cl. 236-1.00G.

Matthews, Russell Byron, to Johnson Controls, Inc. Fuel ignition system providing fuel shutoff under simultaneous failure conditions. 4,087,230, Cl. 431-46.000.

Matthews, Russell Byron, to Johnson Controls, Inc. Slow-opening gas valve. 4,087,231, Cl. 431-59.000.

Mausner, Jack J.: *See—*
Barnett, Gabriel; Gershaw, Nathan; and Mausner, Jack J., 4,087,555, Cl. 424-357.000.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
Ulrich, Reinhard, 4,087,159, Cl. 350-96.120.

Maxey, Loren R. Cargo gate operators. 4,087,129, Cl. 298-18.000.

May, Peter John, to Glaxo Laboratories Limited. Amino-bicycloheptanes. 4,087,551, Cl. 424-325.000.

Maybell, Michael J.; and Hardie, George S., to Raytheon Company. Radio frequency antenna having microstrip feed network and flared radiating aperture. 4,087,822, Cl. 343-778.000.

McCaslin, Robert E. Motorized toy vehicle having improved control means. 4,086,724, Cl. 46-256.000.

McCombe, Bruce D.: *See—*
Kennedy, Thomas A., Jr.; and McCombe, Bruce D., 4,087,745, Cl. 324-58.00B.

McCormack, Ray G., to United States of America, Army. Method and apparatus for normalizing the outputs of sequentially scanned magnetic flaw detectors. 4,087,749, Cl. 324-225.000.

McCrum, William H. Compound combustion engines and methods of compounding same. 4,086,882, Cl. 123-216.000.

McCusker, Michael V.: *See—*
Edelstein, Stephen A.; Lorents, Donald C.; McCusker, Michael V.; and Gallagher, Thomas F., 4,087,765, Cl. 331-94.50G.

McDonald, David Ian, to Cincinnati Milacron Inc. Conveyor combined with coupling for handling workpiece. 4,086,999, Cl. 198-377.000.

McDonnell Douglas Corporation: *See—*
Schier, Joseph F.; and Rosner, Robert E., 4,087,037, Cl. 228-106.000.

McElligott, Michael Jerry; Williams, John Lewis; and Gauger, Russell William, Jr., to Burroughs Corporation. Water extended plastisol film carbon paper. 4,087,580, Cl. 428-307.000.

McEowen, Victor R. Pivot joint housing. 4,087,188, Cl. 403-138.000.

McGarry, Richard A.: *See—*
Green, David Thomas; and McGarry, Richard A., 4,086,926, Cl. 128-334.00R.

McGrath, Gilbert Thomas: *See—*
McGrath, Lindsay Thomas; and McGrath, Gilbert Thomas, 4,087,086, Cl. 269-212.000.

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McGregor, Stanley D., to Dow Chemical Company, The. Preparation of 3,6-dichloropicolinic acid. 4,087,431, Cl. 260-295.00R.

McLean, Arthur F.: *See—*
Fisher, Eugene A.; Goodyear, Michael U.; McLean, Arthur F.; and Styhr, Karsten H., 4,087,500, Cl. 264-42.000.

McNeice, Donald: *See—*
Kolombos, Alexander John; McNeice, Donald; and Wood, Dennis Charles, 4,087,350, Cl. 208-121.000.

McRae, William P. Dispensing cabinet. 4,087,138, Cl. 312-15.000.

McReynolds, Charles P., to Caterpillar Tractor Co. Bucket construction having improved reinforcing means. 4,086,712, Cl. 37-118.00A.

Mecone, David W.: *See—*
Colville, William T.; Mecone, David W.; and Audesse, Emery G., 4,087,849, Cl. 362-13.000.

Medical Instruments & Technology Corp.: *See—*
Burks, Nathaniel W.; Ball, Newton E.; and Britt, David L., 4,086,917, Cl. 128-2.05T.

ek, Flora L.; and Hornung, Richard E., to General Electric Company. Microwave oven food temperature sensing probe assembly including a reflector. 4,086,813, Cl. 73-352.000.

Mefina S.A.: *See—*
Beuchat, Roger, 4,087,774, Cl. 336-73.000.

Mehlhorn, Frank: *See—*
Lindner, Friedrich; and Mehlhorn, Frank, 4,086,958, Cl. 165-104.00S.

Mehta, Rustam J.; and Geilhufe, Michael, to Intel Corporation. Sequential timing circuitry for a semiconductor memory. 4,087,704, Cl. 307-262.000.

Meier, Werner: *See—*
Buchschacher, Paul; Furst, Andor; Labler, Ludwig; Meier, Werner; and Scott, John William, 4,087,436, Cl. 260-307.00H.

Meints, Edward G.: *See—*
Karstensen, Karl W.; and Meints, Edward G., 4,086,757, Cl. 60-39.16R.

Melkersson, Karl-Axel: *See—*
Edenwall, Ingvar A. O.; Ekman, Douglas Sewerin; Elvander, Hans I.; Gorling, Karl Goran; Hellestam, Carl Johan Sigvard; and Melkersson, Karl-Axel, 4,087,274, Cl. 75-10.00R.

Melvin, William J., to Rockwell International Corporation. Digital communications tree searching detection. 4,087,752, Cl. 325-30.000.

Mensch, William D., Jr.: *See—*
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,087,855, Cl. 364-200.000.

Menth, Anton: *See—*
Gaiffi, Sevi; Menth, Anton; and Nagel, Hartmut, 4,087,291, Cl. 148-31.570.

Menzel, Gerhard, to Propper Manufacturing Co., Inc. Glass slides with matted areas. 4,087,154, Cl. 350-92.000.

Mercer, Frank Brian, to F. B. Mercer Limited. Stretching webs of sheet material. 4,087,226, Cl. 425-397.000.

Merck & Co., Inc.: *See—*
Cragoe, Edward J., Jr.; Jones, James H.; and Bicking, John B., 4,087,435, Cl. 260-301.000.
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 4,087,526, Cl. 424-250.000.
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Portnoff, Joel B., 4,087,538, Cl. 424-274.000.
Shen, Tsung-Ying; and Jones, Howard, 4,087,549, Cl. 424-315.000.

Merianos, John J., to Kewanee Industries, Inc. 2,3-Dihalo-1,4-dithiocyano-2-butenes and their homologs. 4,087,451, Cl. 260-454.000.

Merisio, Alberto, to Somet Societa Meccanica Tessile, S.p.A. Weft feed tensioning device in looms having a stationary weft supply. 4,086,942, Cl. 139-450.000.

Merz AG Dulliken: *See—*
Vig, Istvan, 4,086,733, Cl. 51-288.000.

Merz, Herbert; Langbein, Adolf; Walther, Gerhard; and Stockhaus, Klaus, to Boehringer Ingelheim GmbH. Analgesically useful 2-tetrahydrofurfuryl-5-lower alkyl-2-oxy-6,7-benzomorphans and salts thereof. 4,087,532, Cl. 424-267.000.

Merz, Kenneth M.; and Shapiro, Howard E., to TRW Inc. Termination for electrical resistor and method of making the same. 4,087,778, Cl. 338-309.000.

Messier-Hispano, S.A.: *See—*
Masclet, Jean, 4,087,062, Cl. 244-100.00R.

Messner, Dieter: *See—*
Lind, Erwin; and Messner, Dieter, 4,087,828, Cl. 346-158.000.

Metagraphic Systems, Inc.: *See—*
Kinsinger, William C.; and Ippolito, James, 4,087,005, Cl. 209-80.500.

Metal Box Limited: *See—*
Tebbutt, Charles Norman, 4,087,018, Cl. 220-257.000.

Metallgesellschaft Aktiengesellschaft: *See—*
Baron, Gerhard; Bierbach, Herbert; and Hafke, Carl, 4,087,258, Cl. 48-197.00R.
Marschner, Friedemann; Supp, Emil; and Pockrandt, Gunter, 4,087,449, Cl. 260-449.500.

Meyer, Gerd, to USM Corporation. Device for moistening and conditioning leather and the like. 4,086,793, Cl. 69-32.000.

Meyers, Leo J., to Louis A. Grant, Inc. Apparatus for changing blast furnace tuyeres. 4,087,084, Cl. 266-287.000.

Miavecz, Joseph L., to Owens-Illinois, Inc. Write pulse wave form for operating gas discharge device. 4,087,807, Cl. 340-324.00M.

Michaelis, Eduard, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Plant for refining molten pig iron. 4,087,081, Cl. 266-142.000.

Michigan Pipe Fittings Company, Div. of Michigan Hanger Co. Inc.: *See—*
Rumble, Edgar B., 4,087,120, Cl. 285-39.000.

Michurov, Jury Ivanovich: *See—*
Gurvich, Yakov Abramovich; Grinberg, Alexandr Afroimovich; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Starikova, Olga Fedorovna; Yanshevsky, Vladimir Avgustovich; Kumok, Simona Tevievna; Styskin, Evgeny Lvovich; and Rutman, Grigory Iosifich, 4,087,469, Cl. 568-723.000.

Midrex Corporation: *See—*
Beggs, Donald, 4,087,275, Cl. 75-35.000.

Mietzner, Franz Georg; Buechner, Oskar; Steigerwald, Klaus; Schlichthaerle, Gottfried; and Urban, Friedrich, to BASF Aktiengesellschaft. Multi-stage isolation of high pressure polyethylene. 4,087,602, Cl. 528-481.000.

Mietzner, Franz Georg: *See*—
Pfleger, Klaus; Zacher, Wieland; Boettcher, Klaus; Skorczyk, Ronald; Buechner, Oskar; and Mietzner, Franz Georg, 4,087,601, Cl. 526-329.000.
Miki, Tamotsu; Imai, Akio; and Kobayashi, Yuji, to Sumitomo Chemical Company, Limited. Process for producing transparent block copolymer resin. 4,087,484, Cl. 260-880.00B.
Miklos, Louis F. Flush control device for conserving water. 4,086,667, Cl. 4-325.000.
Mikuni Kogyo Kabushiki Kaisha: *See*—
Umehara, Hidetoshi, 4,087,495, Cl. 261-81.000.
Milberger, Ernest C.: *See*—
Bremer, Noel J.; White, James F.; and Milberger, Ernest C., 4,087,446, Cl. 260-346.750.
Miles, Laughton E. Multiple assay machine and method. 4,087,248, Cl. 23-230.00B.
Miller, Allan G.; Himka, John; and Patrick, Gerald L., to General Motors Corporation. Spare tire stowage assembly. 4,087,032, Cl. 224-42.230.
Miller, J. Stanley, to Olin Corporation. Process for the production of alkali metal chlorites. 4,087,515, Cl. 423-472.000.
Miller, Jean C.: *See*—
Katner, Allen S.; Gutowski, Gerald E.; and Miller, Jean C., 4,087,429, Cl. 260-287.00B.
Miller, John W. V., to Owens-Illinois, Inc. Slow rise time write pulse for gas discharge device. 4,087,805, Cl. 340-324.00M.
Miller, Laurence Lockhart, to TRW Inc. Gerotor gearset device. 4,087,215, Cl. 418-61.00B.
Miller, Michael James. Plasma display control apparatus. 4,087,806, Cl. 340-324.00M.
Miller, Samuel L., to Lukens Steel Corp. Process for suppression of noise and fumes generated by plasma-arc cutting operation. 4,087,670, Cl. 219-121.00P.
Milliken Research Corporation: *See*—
Bylund, Don M., 4,087,311, Cl. 156-511.000.
Thomas, Manuel Andrew; and Logan, Jerry Albert, Jr., 4,087,243, Cl. 8-31.000.
Milstein, Joseph Beril. Process and apparatus for preparation of single crystals and textured polycrystals. 4,087,313, Cl. 156-602.000.
Minami, Hidehiro; and Abe, Kazuo, to Nissan Motor Company, Limited. Carburetor with altitude compensation assembly. 4,086,890, Cl. 123-119.0EC.
Miniere, Jack K. Intermittent inflatable apparatus. 4,086,920, Cl. 128-24.00R.
Minner, Willy; and Rall, Bernhard, to Licentia Patent-Verwaltungs-G.m.b.H. Circuit for producing direct voltages from pulses. 4,087,813, Cl. 340-347.0DA.
Minnesota Mining and Manufacturing Company: *See*—
Alexander, Jerry L.; and Pendergrass, Daniel B., Jr., 4,087,181, Cl. 355-92.000.
Groves, James D., 4,087,412, Cl. 260-75.0NB.
Lemberger, Richard R., 4,087,791, Cl. 340-152.00T.
Rydeen, Robert L.; and Vandervort, John D., 4,086,871, Cl. 118-60.000.
Weavers, Mark W., 4,087,145, Cl. 312-319.000.
Minolta Camera Kabushiki Kaisha: *See*—
Ueda, Hiroshi; and Oyokota, Shigeru, 4,087,829, Cl. 354-38.000.
Mischenko, Peter S.: *See*—
Pasturczak, Vincent S.; and Mischenko, Peter S., 4,087,165, Cl. 352-157.000.
Misdom, Theodore H., Jr.: *See*—
Bessett, Clifford H.; Boyd, James W.; and Misdom, Theodore H., Jr., 4,087,040, Cl. 229-2.5EC.
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Mitsubishi Chemical Industries Ltd.: *See*—
Sugimoto, Masaaki; Matsumoto, Yoshio; Ikeya, Nobushige; and Hasegawa, Koichi, 4,087,505, Cl. 264-95.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Akamatsu, Masahiko, 4,087,703, Cl. 307-253.000.
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Mitsubishi Gas Chemical Company, Inc.: *See*—
Kamiyama, Seiichi; Nagai, Norio; and Miyamoto, Hiroaki, 4,087,414, Cl. 260-77.5NC.
Sugio, Akitoshi; Ohtsuki, Yoshiharu; Umemura, Toshikazu; and Mizutani, Makoto, 4,087,411, Cl. 260-67.0FP.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
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Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
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Yasuda, Kazuyoshi; Hasegawa, Harumi; and Hosokawa, Yoshihiko, 4,087,055, Cl. 242-18.0DD.
Mitsui, Akio; Miyazako, Takushi; and Ogawa, Takashi, to Fuji Photo Film Co., Ltd. Flocculating agent for photographic emulsions. 4,087,282, Cl. 96-94.00R.
Mitsui, Hiroyasu. Drain device for oil pans. 4,086,981, Cl. 184-1.500.
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Kamiyama, Seiichi; Nagai, Norio; and Miyamoto, Hiroaki, 4,087,414, Cl. 260-77.5NC.
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Miyatera, Hiroyuki: *See*—
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Mitsui, Akio; Miyazako, Takushi; and Ogawa, Takashi, 4,087,282, Cl. 96-94.00R.
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Mizutani, Koichi: *See*—
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Mo och Domsjo Aktiebolag: *See*—
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Mobil Oil Corporation: *See*—
Latham, Raymond E.; and Usquin, Bernard P., 4,086,778, Cl. 61-110.000.
Moedritzer, Kurt, to Monsanto Company. Polyphosphinate flame retardants. 4,087,403, Cl. 260-45.70P.
Moedritzer, Kurt, to Monsanto Company. Bromine and phosphorus containing polyester. 4,087,408, Cl. 260-47.00P.
Moeller, Charles E., deceased (by Moeller, Linda Kay, executrix). Comminuting apparatus. 4,087,051, Cl. 241-27.000.
Moeller, Linda Kay, executrix: *See*—
Moeller, Charles E., deceased, 4,087,051, Cl. 241-27.000.
Mohler, Galen E., to Lexel Corporation. Laser having beam terminating mechanism. 4,087,766, Cl. 331-94.50M.
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Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,087,424, Cl. 260-268.00C.
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Shamma, Maurice; and Moniot, Jerome L., 4,087,426, Cl. 260-286.00R.
Monsanto Company: *See*—
Balaban, Stephen M.; and Cox, Raymond C., Jr., 4,087,608, Cl. 544-190.000.
Bloomfield, Jordan J., 4,087,342, Cl. 204-157.10R.
Feder, Joseph; Ku, Katharine; and Kuo, Mau-Jung, 4,087,327, Cl. 195-1.700.
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Sargent, Michael R.; Schwartz, Robert G.; and Brown, John G., Jr., 4,087,295, Cl. 148-143.000.
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Monsanto North Carolina Incorporated: *See*—
Frank, Floyd; and Woodward, Aylmer John, 4,087,242, Cl. 8-15.000.
Monte, Salvatore J.; and Sugerman, Gerald, to Kenrich Petrochemicals, Inc. Organo-titanate chelates and their uses. 4,087,402, Cl. 260-42.140.
Montedison S.p.A.: *See*—
Patron, Germano; Napoli, Domenico; Nardone, Franco; Ratti, Gianluigi; and Tubiello, Giuseppe, 4,087,359, Cl. 210-50.000.
Piccardi, Paolo; Corda, Francesco; Gozzo, Franco; Longoni, Angelo; and Renis, Giovanni, 4,087,489, Cl. 260-949.000.
Moon, Roger A.; and Garofalo, Frank J., to Ford Motor Company. Method and apparatus for controlling the amount of fuel metered into an internal combustion engine. 4,086,884, Cl. 123-32.0EB.
Moore, Edwin Bailey. Implant injector. 4,086,914, Cl. 128-1.200.
Moore, Leon; and Smith, George E., Jr. Aquarium-terrarium structure. 4,086,876, Cl. 119-5.000.
Moore, Willard S. Preparing manganese oxide coated acrylic fiber and article therefrom. 4,087,583, Cl. 428-378.000.
Mori, Kazumasa; Morishima, Toshio; and Itoh, Katsumi, to Nippondenso Co., Ltd. Current generating system. 4,087,736, Cl. 322-28.000.
Morimoto, Yoshio, to Toyo Kogyo Co., Ltd. Drive axle suspension system in motor vehicle. 4,087,116, Cl. 280-724.000.
Morishima, Toshio: *See*—
Mori, Kazumasa; Morishima, Toshio; and Itoh, Katsumi, 4,087,736, Cl. 322-28.000.
Morita, Akira: *See*—
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Morita, Sizuo; Thuchiya, Hiroshi; and Kimura, Kiyoshi, to Konishiroku Photo Industry Co., Ltd. Electrophotographic developing device

incorporating a developing electrode having an insulation layer on its surface. 4,086,873, Cl. 118-658.000.
Morris, Barry Stanley: *See—*
Shaw, Leslie Ralph; and Morris, Barry Stanley, 4,087,122, Cl. 292-218.000.
Morton, Douglas Ross, Jr., to Upjohn Company, The. 3,7-Inter-m-phenylene-4,5,6-trinor-13,14-dihydro-PGD$_1$ compounds. 4,087,615, Cl. 560-53.000.
Moser, Helmut: *See—*
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Moser, Kurt, to Upjohn Company, The. Integral skin cushion molding apparatus. 4,087,224, Cl. 425-388.000.
Moser, Kurt, to Upjohn Company, The. Method for the continuous production of tubular foamed plastic pipe sleeves insulating. 4,087,501, Cl. 264-45.800.
Moser, Robert: *See—*
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P. R. Mallory & Co. Inc., to P.R. Mallory & Co. Inc. Multi-cell battery and method of making. 4,087,595, Cl. 429-153.000.
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P. R. Mallory & Co. Inc., 4,087,595, Cl. 429-153.000.
Packaging Corporation of America: *See*—
Bessett, Clifford H.; Boyd, James W.; and Misdom, Theodore H., Jr., 4,087,040, Cl. 229-2.5EC.
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Pako Corporation: *See*—
Jensen, Gerald A.; and Diesch, Robert E., 4,086,836, Cl. 83-521.000.
Pan, Peter Naw Yank, to Continental Group, Inc., The. Electrostatic coating with post charger web or coil coating and powder feed. 4,086,872, Cl. 118-630.000.
Pansini, Andrew L. Automatic pool cleaner system with timer device. 4,086,933, Cl. 137-119.000.
Papco Tool Corporation: *See*—
Wolcott, Glenn R., 4,087,225, Cl. 425-392.000.
Pappo, Raphael: *See*—
Collins, Paul W.; and Pappo, Raphael, 4,087,447, Cl. 260-429.700.
Collins, Paul W.; and Pappo, Raphael, 4,087,621, Cl. 560-231.000.
Pardini, John A.: *See*—
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Pardy, Ronald P.: *See*—
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Tinney, Francis John, 4,087,417, Cl. 260-112.5LH.
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Wittle, Eugene Leroy, 4,087,418, Cl. 260-112.5LH.
Parker & Harper Mfg. Co., Inc., The: *See*—
Massey, Roger G.; and Holloway, David G., 4,087,074, Cl. 251-58.000.
Parker, James A., to Collier-Keyworth Company. Chair height limit stop. 4,087,071, Cl. 248-406.000.
Parker Manufacturing Company: *See*—
Ewig, John F., Jr., 4,086,802, Cl. 72-391.000.
Parks, Carl R., to Goodyear Tire & Rubber Company, The. Amine containing antioxidants. 4,087,619, Cl. 560-104.000.
Passereau, Genevieve, to Instruments S.A. Spectrograph. 4,087,183, Cl. 356-79.000.
Pasturczak, Vincent S.; and Mischenko, Peter S., to Bell & Howell Company. Film tension absorbing system. 4,087,165, Cl. 352-157.000.
Patrick, Gerald L.: *See*—
Miller, Allan G.; Himka, John; and Patrick, Gerald L., 4,087,032, Cl. 224-42.230.
Patron, Germano; Napoli, Domenico; Nardone, Franco; Ratti, Gianluigi; and Tubiello, Giuseppe, to Montedison S.p.A. Process for removing mercury and mercury salts from liquid effluents. 4,087,359, Cl. 210-50.000.
Patterson, Michael P. Greeting card and ornament. 4,087,576, Cl. 428-8.000.
Paul, John C., to Information Identification Co., Inc. Communication apparatus for communicating between a first and a second object. 4,087,753, Cl. 325-38.00R.
Pauli, Otto; Genth, Hermann; and Wolz, Hermann, to Bayer Aktiengesellschaft. Composition for disinfecting soil and combating plant diseases containing organic dicarbonates. 4,087,543, Cl. 424-301.000.
Pawloski, Chester E., to Dow Chemical Company, The. Pyridyl-phosphonamidothioates, pyridylphosphorodiamidothioates, oxy analogues thereof and derivatives thereof. 4,087,430, Cl. 260-294.80K.
Payne, Roger E., to Goodyear Tire & Rubber Company, The. Traction shoe seal. 4,086,947, Cl. 152-175.000.
Peddle, Charles I.: *See*—
Bennett, Thomas H.; Carlow, Earl F.; Hepworth, Edward C.; Mathys, Wilbur L.; Mensch, William D., Jr.; Orgill, Rodney H.; Peddle, Charles I.; and Wiles, Michael F., 4,087,855, Cl. 364-200.000.
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Pendergrass, Daniel B., Jr.: *See*—
Alexander, Jerry L.; and Pendergrass, Daniel B., Jr., 4,087,181, Cl. 355-92.000.
Penet, Pierre Marie Marcel. System for mounting rotary components. 4,086,811, Cl. 73-231.00R.
Peoples, John Terrance, to Bell Telephone Laboratories, Incorporated. Testing of inductively loaded transmission lines for correct loading. 4,087,637, Cl. 179-175.30R.
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Blum, Frederick David; Hester, Donald Larry; and Peoples, John Terrance, 4,087,656, Cl. 179-175.30R.
Perkins, Jack Kenneth, to Post Office, The. L-type matching pad for coaxial lines. 4,087,767, Cl. 333-33.000.
Permco, Inc.: *See*—
Shumate, Donald L., 4,087,216, Cl. 418-74.000.
Perrot, Roger, to Nouveaux Etablissements Sueur, a part interest. Stirring apparatus for treating waste liquids. 4,087,496, Cl. 261-93.000.
Perun, Thomas John; Rasmussen, Ronald Robert; and Horrom, Bruce Wayne, to Abbott Laboratories. 2,4-Diamino-5-benzylpyrimidines. 4,087,528, Cl. 424-251.000.
Petermann, Walter E., to Carbo-Economy, S.A. Apparatus for providing a uniform combustible air-fuel mixture. 4,087,493, Cl. 261-44.00D.
Peters, Donald L., to Phillips Petroleum Company. Blow molding method using extendable mandrel and blow needle. 4,087,503, Cl. 264-89.000.
Peterson, Carl R.; and Fisk, Allan T., to Rapidex, Inc. Drag bit excavation. 4,087,131, Cl. 299-18.000.
Peterson, Charles A., Jr. Method and apparatus for generating power by sea wave action. 4,086,775, Cl. 61-20.000.
Peterson, Russel R.: *See*—
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Petterson, Tor H. Barrier package. 4,087,026, Cl. 222-386.500.
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Rothbart, Michael; and Petterson, Tor H., 4,087,166, Cl. 353-26.00A.
Petty, John L., Jr. Flask and pattern starter. 4,086,954, Cl. 164-404.000.
Petzold, Manfred; Grunert, Heinz; and Becker, Klaus, to Henkel Kommanditgesellschaft auf Aktien. Process for the dyeing of polyacrylonitrile fibers. 4,087,247, Cl. 8-169.000.
Pfeifer, Josef; Schnall, Gunther; Aldenhoven, Klaus; and Blochl, Hanns, to AGFA-Gevaert, A.G. Sheet-holding cassette for copying machine. 4,087,178, Cl. 355-72.000.
Pfizer Inc.: *See*—
Bindra, Jasjit S.; and Johnson, Michael R., 4,087,604, Cl. 542-426.000.
Cronin, Timothy H.; Faubl, Hermann; Hoffman, William W.; and Korst, James J., 4,087,552, Cl. 424-330.000.
Pfleger, Klaus; Zacher, Wieland; Boettcher, Klaus; Skorczyk, Ronald; Buechner, Oskar; and Mietzner, Franz Georg, to BASF Aktiengesellschaft. Manufacture of ethylene/n-butyl acrylate copolymers. 4,087,601, Cl. 526-329.000.

Pfrommer, Arthur M.: *See—*
Vaskys, Petras; and Pfrommer, Arthur M., 4,086,666, Cl. 3-36.000.
Phelan, Harry Richard, to Harris Corporation. Polarization controllable lens. 4,087,821, Cl. 343-754.000.
Phelps, Orville F.; and MacRitchie, Innis J., to Dana Corporation. Drive shaft assembly and method. 4,087,593, Cl. 428-683.000.
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Hughes, William B., 4,087,472, Cl. 568-906.000.
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Solomon, Paul W., 4,087,468, Cl. 568-807.000.
Solomon, Paul W., 4,087,468, Cl. 568-807.000.
Piccardi, Paolo; Corda, Francesco; Gozzo, Franco; Longoni, Angelo; and Renis, Giovanni, to Montedison S.p.A. Insecticidal N-polychloroallylamido-thiophosphoric esters. 4,087,489, Cl. 260-949.000.
Pichler, Peter; and Ranner, Dietrich, to Aral Austria Gesellschaft m.b.H. Accounting and cash-transfer system for filling stations having metered pumps. 4,087,858, Cl. 364-465.000.
Pierce, James K., to Dow Chemical Company, The. (Polychlorophenoxy) methyl esters of thiocyanic acid. 4,087,450, Cl. 260-454.000.
Pietrusza, Arthur Jacob: *See—*
Harig, Richard Francis; Pietrusza, Arthur Jacob; Riebel, Albert Harry, Jr.; and Kent, Harry James, 4,087,334, Cl. 202-269.000.
Pietryka, Joseph, to Fives-Cail Babcock. Head for a starter bar used in the continuous casting of molten metal. 4,086,955, Cl. 164-446.000.
Pigeon, Michel; and Saglio, Robert, to Commissariat a l'Energie Atomique. Pneumatic drive device for a probe, particularly an eddy current measuring probe. 4,087,748, Cl. 324-220.000.
Pilarski, Regis Victor: *See—*
Foster, Ronald Charles; and Pilarski, Regis Victor, 4,086,795, Cl. 70-233.000.
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Pitcher, Wayne H., Jr.: *See—*
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Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, to International Flavors & Fragrances Inc. Uses in tobacco and as a tobacco flavor additive of enol esters. 4,086,927, Cl. 131-17.00R.
Plattner, Werner, executor: *See—*
Braun, Franz; Stach, Kurt, deceased; Plattner, Werner, executor; Thiel, Max; Sponer, Gisbert; and Dietmann, Karl, 4,087,520, Cl. 424-177.000.
Pledger, Peter William: *See—*
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Poirier, Victor L., to Thermo Electron Corporation. Artificial blood conduit. 4,086,665, Cl. 3-1.400.
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Poot, Cornelis; Verburg, Charles Cornelis; Kirton, Douglas Chater; and MacNeill, Avril Brown, to Lever Brothers Company. Fractionated co-randomized fat blend and use. 4,087,564, Cl. 426-603.000.
Poppe, Wassily: *See—*
Fielding, Ivor R.; and Poppe, Wassily, 4,087,486, Cl. 260-897.00A.
Porter, Herschel D.; and Williams, James C., to Eli Lilly and Company. Substituted N-alkoxy-N-substituted-2,6-dinitroanilines and intermediates for the preparation thereof. 4,087,460, Cl. 260-574.000.
Porter, Richard B., to Honeywell Inc. Adjustable stroke electric motor using stroke adjusting linkage means. 4,087,728, Cl. 318-466.000.
Portnoff, Joel B., to Merck & Co., Inc. Ophthalmic suspensions. 4,087,538, Cl. 424-274.000.
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Pratt, George W., Jr., to Massachusetts Institute of Technology. Spark plug. 4,087,719, Cl. 315-45.000.
Prescher, Gunter; Weiberg, Otto; Waldmann, Helmut; and Seifert, Hermann, to Deutsche Gold- und Silber-Scheideanstalt Vormals Roessler; and Bayer Aktiengesellschaft. Process for the preparation of perpropionic acid solutions. 4,087,454, Cl. 260-502.00R.
Prescher, Gunter; Schreyer, Gerd; Waldmann, Helmut; and Schwerdtel, Wulf, to Bayer Aktiengesellschaft; and Deutsche Gold-und Silber-Scheideanstalt Vormal Roessler. Process for the continuous preparation of percarboxylic acids in organic solutions. 4,087,455, Cl. 260-502.00R.
Presray Corporation, The: *See—*
Covey, George H., III; and Stenabaugh, Donald D., 4,086,806, Cl. 73-49.500.
Preston, Jack, to Monsanto Company. Ordered heterocyclic copolymers. 4,087,409, Cl. 260-65.000.
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Pritchard, Eric K. Digital stepping motor device circuit. 4,087,732, Cl. 318-696.000.
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Process Products, Inc.: *See—*
Datis, Angelo P., 4,087,228, Cl. 431-5.000.
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Smith, Rory James Maxwell; and Mackie, Gordon John, 4,087,518, Cl. 424-70.000.
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Quentin, Jean-Pierre, to Rhone-Poulenc Industries. Ion-exchanger alkylsulphonated phenoxy polymers for membranes. 4,087,391, Cl. 260-2.20R.
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Ramsey, William K. Apparatus and method for refinishing the end surface of a railroad axle. 4,086,732, Cl. 51-241.00S.
Rank Xerox Ltd.: *See—*
Fukase, Yasuji, 4,087,676, Cl. 219-216.000.
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Ratti, Gianluigi: *See—*
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Raulins, George M.; and Waters, Fleming A., to Otis Engineering Corporation. Remote controlled tubing safety valve. 4,086,935, Cl. 137-522.000.
Rausch, Richard E., to UOP Inc. Dehydrocyclization with an acidic multimetallic catalytic composite. 4,087,351, Cl. 208-139.000.
Rausch, Richard E., to UOP Inc. Hydroprocessing of sulfurous kerosene to improve jet fuel characteristics thereof. 4,087,353, Cl. 208-143.000.
Raymond Lee Organization, Inc., The: *See—*
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Raypak, Incorporated: *See*—
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Maybell, Michael J.; and Hardie, George S., 4,087,822, Cl. 343-778.000.
RCA Corporation: *See*—
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Recognition Equipment Incorporated: *See*—
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Reed, Russell, Jr., to United States of America, Navy. Novel method for the production of hydrogen and hydrogen-carbon monoxide mixtures. 4,087,373, Cl. 252-188.30R.
Reese, Eckart; and Wank, Joachim, to Bayer Aktiengesellschaft. Heat sealable sheet materials. 4,087,578, Cl. 428-216.000.
Reese, Stanton L.; and Leaders, William M., to Uranium Recovery Corporation. Process for removing solid organic material from wet-process phosphoric acid. 4,087,512, Cl. 423-321.00R.
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Reichgut, Martin. Fireplace shield. 4,086,906, Cl. 126-140.000.
Reid, Alan Forrest, to Commonwealth Scientific and Industrial Research Organization. Solar absorber surfaces. 4,087,288, Cl. 148-6.200.
Reinehr, Ulrich; Braun, Hans-Dieter; and Dippelhofer, Robert, to Bayer Aktiengesellschaft. Process for the production of dyed acrylic fibres. 4,087,494, Cl. 264-78.000.
Reineke, Charles E.; and Goralski, Christian T., to Dow Chemical Company, The. N-(5,7-dibromo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium bromide, N-(5,7-diiodo-1,3-benzoxathiol-2-ylidene)-N-methylmethanaminium iodide and their preparation. 4,087,445, Cl. 260-327.00M.
Reinert, Gerhard; Lohmann, Frank; and Dussy, Paul, to Ciba-Geigy Corporation. Stable formulations of textile-processing agents. 4,087,240, Cl. 8-1.00W.
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Reliance Telecommunication Electronics Company: *See*—
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Remington Arms Company, Inc.: *See*—
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Wong, John Lui, 4,087,434, Cl. 260-297.00T.
Research Triangle Institute: *See*—
Swaisgood, Harold E., 4,087,328, Cl. 195-63.000.
Ressler, Friedrich, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Mntan Aktiengesellschaft. Device for guying a movable cutting machine. 4,087,132, Cl. 299-33.000.
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Reynolds, Charles A., to SmithKline Instruments, Incorporated. Ultrasonic imaging apparatus. 4,086,818, Cl. 73-620.000.
Reynolds, John Dudley, to Lesney Products & Co. Limited. Toy projectile launching apparatuses. 4,086,902, Cl. 124-61.000.
Rheinecker, Tom Conrad, to Procter & Gamble Company, The. 1,2-Bis (thioalkyl) alkanes and derivatives thereof as abscission agents. 4,087,271, Cl. 71-98.000.
Rhoades, John M., to General Electric Company. Control system for moving a large machine along a single axis. 4,087,731, Cl. 318-625.000.
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Decor, Jean-Pierre, 4,087,465, Cl. 260-615.00A.
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Richardson, Veda N. Walking aid. 4,086,932, Cl. 135-67.000.
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Riedel, Tilo, to S.A. Etablissements Francois Salomon & Fils. Ski brake. 4,087,113, Cl. 280-605.000.
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Holm, William J., 4,087,264, Cl. 55-418.000.
Riley, Michael W.; Duncan, Lane S.; and Bochmann, Carl E., to General Motors Corporation. Viscous fluid clutch. 4,086,987, Cl. 192-58.00B.
Rioult, Jean-Pierre; and Fabien, Raymond, to U.S. Philips Corporation. Preferential etchant for aluminium oxide. 4,087,367, Cl. 252-79.100.
Ristvedt, Victor G.; and Johnson, Roy B. Coin sorting machine. 4,086,928, Cl. 133-3.00A.
Ritter, Arthur F. Two part piercing earring with an ornament on each part. 4,086,786, Cl. 63-13.000.
Ritter Corporation: *See*—
Barnes, John A., 4,087,705, Cl. 307-265.000.
Roalsvig, Melvin John: *See*—
Arnquist, Willard Dale; and Roalsvig, Melvin John, 4,087,065, Cl. 244-836.000.
Robbins, Medford Dwight: *See*—
Garrison, Charles Michael; Mast, Roy Clark; and Robbins, Medford Dwight, 4,087,273, Cl. 71-100.000.
Robbins, Robert. Fishing sinker. 4,086,719, Cl. 43-44.900.
Robert Bosch GmbH: *See*—
Binder, Georg, 4,087,713, Cl. 310-266.000.
Zabler, Erich; Heintz, Frieder; and Kopernik, Viktor, 4,087,804, Cl. 340-319.000.
Robert Christy Engineering Limited: *See*—
Christy, Robert Fell, 4,086,746, Cl. 53-188.000.
Robert, Lawrence A.; and Gunderson, Richard A., to Magnetic Controls Company. Printed circuit card edge connector with normalling contacts. 4,087,151, Cl. 339-176.0MP.
Robertiello, Andrea: *See*—
Marconi, Walter; Olivieri, Roberto; Degen, Ludwig; and Robertiello, Andrea, 4,087,356, Cl. 210-11.000.
Roberts, Aubrey Gene. Micrometer gauge. 4,086,703, Cl. 33-164.00R.
Roberts, Edward H., to General Electric Company. Door pull handle assembly. 4,087,141, Cl. 312-320.000.
Roberts, James R., to Eucatex S.A. Industria e Comercio. High yield, low cost cellulosic pulp and hydrated gels therefrom. 4,087,317, Cl. 162-23.000.
Roberts, William J., to Eltra Corporation. Electronic vacuum modulator for controlling air flow to a throttle modulator mechanism for limiting engine speed and vehicle speed. 4,086,888, Cl. 123-102.000.
Robertshaw Controls Company: *See*—
Teichert, Allen L.; and Chambers, William W., 4,087,229, Cl. 431-43.000.
Robinson, Cecil H., to Johns Hopkins University, The. Anti-androgenic steroids. 4,087,461, Cl. 260-586.00E.
Robinson, Leon; and Bauer, Hans F., to Occidental Petroleum Corporation. Process for desulfurizing char. 4,087,514, Cl. 423-461.000.
Rockwell International Corporation: *See*—
Brown, James L., 4,087,796, Cl. 340-187.000.
Cunningham, Vernon R., 4,087,757, Cl. 329-143.000.
Hamermesh, Charles L.; and Kaelble, David H., 4,086,852, Cl. 101-147.000.
Melvin, William J., 4,087,752, Cl. 325-30.000.
Rodseth, John Kolbjorn: *See*—
Head, William J.; Kampinga, Erik R.; and Rodseth, John Kolbjorn, 4,087,306, Cl. 156-401.000.
Roe, James M.; and Priddy, Duane B., to Dow Chemical Company, The. Preparation of a water-soluble polyvinylbenzyl quaternary ammonium halide. 4,087,599, Cl. 526-46.000.
Roelevink, Bauke Jacob: *See*—
van Werkhoven, Jan; and Roelevink, Bauke Jacob, 4,087,724, Cl. 315-323.000.
Rogers, Walter McDowell, Jr., to Harris Corporation. FM Feedback demodulator having threshold extension circuit with two-pole crystal filters. 4,087,756, Cl. 329-50.000.
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert R., to Bayer Aktiengesellschaft. 4-(3-Trifluoromethylphenoxy)-phenylurea compounds and herbicidal compositions. 4,087,272, Cl. 71-120.000.
Rohm and Haas Company: *See*—
Aller, Harold E.; Kilbourn, Edward E.; Weiler, Ernest D.; and Weir, William D., 4,087,521, Cl. 424-211.000.
Barrett, James H.; and Clemens, David H., 4,087,357, Cl. 210-32.000.
Marks, Allen P., 4,087,335, Cl. 203-6.000.
Martorano, Richard; and Brendley, William H., Jr., 4,087,397, Cl. 260-29.6WB.
Rohrbach, Hans, deceased (by Rohrbach, Herta, administratrix), to Ilok Power Co., Inc. Vertical impact mill for the reduction of four micron finest powder. 4,087,052, Cl. 241-65.000.
Rohrbach, Herta, administratrix: *See*—
Rohrbach, Hans, deceased, 4,087,052, Cl. 241-65.000.
Rollei-Werke Franke & Heidecke: *See*—
Albrecht, Hermann Friedrich, 4,087,167, Cl. 353-116.000.
Bode, Kurt; and Vehrke, Heinz, 4,087,164, Cl. 352-141.000.

Rolscreen Company: *See*—
Kuyper, Herman S.; Anthony, Tad B.; and Evers, Robert S., 4,086,727, Cl. 49-255.000.
Ropp, Richard C., to Allied Chemical Corporation. Glasses prepared by the melting of stoichiometric compounds. 4,087,511, Cl. 423-277.000.
Rose, John Arthur: *See*—
Abbott, Robert William; Howard, Raymond Stanley; and Rose, John Arthur, 4,087,000, Cl. 198-454.000.
Rose, Le Roy: *See*—
Convers, Ronald J.; and Rose, Le Roy, 4,087,457, Cl. 260-513.00B.
Rosemeyer, Friedrich; Walker, Wolfram Hubert; Ganshirt, Karl-Heinz; and Wendt, Heinz, to Biotest-Serum-Institut GmbH. Filter for blood. 4,087,363, Cl. 210-315.000.
Rosemount Inc.: *See*—
Brown, William L.; and Geronime, Robert L., 4,087,693, Cl. 250-390.000.
Rosen, Perry: *See*—
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,087,488, Cl. 260-940.000.
Rosner, Robert E.: *See*—
Schier, Joseph F.; and Rosner, Robert E., 4,087,037, Cl. 228-106.000.
Rossler, Bernward, to Siemens Aktiengesellschaft. Memory field effect storage device. 4,087,795, Cl. 365-185.000.
Rossmy, Gerd; and Langenhagen, Rolf-Dieter, to Th. Goldschmidt AG. Process for preparing equilibrated organopolysiloxane mixtures with organosulfonic acid groups linked to silicon. 4,087,448, Cl. 260-448.20E.
Rothbart, Michael; and Petterson, Tor H., to Terminal Data Corporation. Microfiche roll reproducer. 4,087,166, Cl. 353-26.00A.
Rothschild, Henry H., to Caddy Corporation of America. Heat storage dish. 4,086,907, Cl. 126-246.000.
Rowland, Robert S., to Tranter, Inc. Solar absorber panel. 4,086,910, Cl. 126-271.000.
Ruby, Joseph H., to Sperry Rand Corporation. Precision pneumatic pressure supply system. 4,086,804, Cl. 73-4.00R.
Rudkin-Wiley Corporation: *See*—
Wiley, Nathaniel C., Jr., 4,087,124, Cl. 296-1.00S.
Rudolf, Alfons: *See*—
Kinderling, Eckart; Erauw, Herwig; Rudolf, Alfons; and Klintworth, Helmut, 4,086,805, Cl. 73-359.00R.
Ruiz, Juan Ramon Conde: *See*—
Garcia, Antonio Alcaide; Ruiz, Juan Ramon Conde; and Lozano, Juan Bermejo, 4,087,425, Cl. 544-383.000.
Rumble, Edgar B., to Michigan Pipe Fittings Company, Div. of Michigan Hanger Co. Inc. Pipe coupling with a wedging contractile ring. 4,087,120, Cl. 285-39.000.
Runberg, James E.; and Tunstall, Karl N., to Otis Engineering Corporation. Safety valve with a hydraulic actuator. 4,087,073, Cl. 251-28.000.
Rushton, Brian M.: *See*—
Takahashi, Akio; Smith, Geoffrey H.; Rushton, Brian M.; and Annis, Myron C., 4,087,480, Cl. 260-847.000.
Russell, Carl D., to Brooks, Robert G.; and Brooks, Wretha M. Subsurface pumping unit incorporating heavy duty reversing valve and method of operating. 4,087,206, Cl. 417-53.000.
Russo, Ronald D., to Chesebrough-Pond's Inc. Inhalation device. 4,086,918, Cl. 128-2.080.
Rutman, Grigory Iosifich: *See*—
Gurvich, Yakov Abramovich; Grinberg, Alexandr Afroimovich; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Starikova, Olga Fedorovna; Yanshevsky, Vladimir Avgustovich; Kumok, Simona Tevievna; Styskin, Evgeny Lvovich; and Rutman, Grigory Iosifich, 4,087,469, Cl. 568-723.000.
Rutten, Jean J., to Fabrique Nationale Herstal S.A., en abrege FN. Rotary engine. 4,086,881, Cl. 123-228.000.
Ryan, Charles W.: *See*—
Dominianni, Samuel J.; and Ryan, Charles W., 4,087,410, Cl. 568-766.000.
Rydeen, Robert L.; and Vandervort, John D., to Minnesota Mining and Manufacturing Company. Lubricator roll. 4,086,871, Cl. 118-60.000.
Ryobi, Ltd.: *See*—
Yamasaki, Tatuya; and Sazaki, Kounin, 4,087,058, Cl. 242-84.51A.
S/V Tool Company, Inc.: *See*—
Smith, Lloyd T., 4,086,831, Cl. 81-62.000.
Saccoccio, Louis. Kit and components for constructing decorative polyhedrals. 4,086,738, Cl. 52-270.000.
Sadlon, Ronald A.: *See*—
Munson, Harold C.; and Sadlon, Ronald A., 4,087,221, Cl. 425-78.000.
Safir, Sidney Robert, to American Cyanamid Company. Substituted benzodiazepines and method of use. 4,087,421, Cl. 260-243.300.
Saglio, Robert: *See*—
Pigeon, Michel; and Saglio, Robert, 4,087,748, Cl. 324-220.000.
Sahm, Wilfried; Hille, Ernst; and Schiller, Wolfgang, to Hoechst Aktiengesellschaft. Process for the preparation of 5-acetoacetylaminobenzimidazolone. 4,087,610, Cl. 548-305.000.
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, to Toyama Chemical Co., Ltd. Novel penicillins and cephalosporins and process for producing the same. 4,087,424, Cl. 260-268.00C.
Saint-Gobain Industries: *See*—
Goutte, Rene; Battigelli, Jean A.; and Barthe, Marie-Pierre, 4,087,267, Cl. 65-5.000.
Saito, Shoichi, to Olympus Optical Co., Ltd. Tape pad support assembly for use in magnetic tape cassettes. 4,087,845, Cl. 360-130.000.
Saito, Tadao: *See*—
Yamazaki, Shin-ichi; Asakawa, Makoto; and Saito, Tadao, 4,087,729, Cl. 318-601.000.
Saitoh, Shigeru; Watanabe, Tetsuya; Konno, Koji; and Nakamura, Tadashi, to Kureha Kagaku Kogyo Kabushiki Kaisha. An absorbing solution for the removal of nitrogen oxide form a gas containing same. 4,087,372, Cl. 252-184.000.
Sakura Denki Kabushiki Kaisha: *See*—
Kato, Hiroshi, 4,086,970, Cl. 173-162.000.
Sakurai, Yoshitoshi; and Kajitani, Ikuo, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust reaction apparatus for multi-cylinder internal combustion engine. 4,086,762, Cl. 60-282.000.
Samreus nee Maymarev, Nikolay. Programmable timing device for indicating appointments. 4,087,679, Cl. 235-441.000.
Samuelson, Hans Olof; and Abrahamsson, Kjell Evert, to Mo och Domsjo Aktiebolag. Oxygen-alkali delignification of lignocellulosic material in the presence of a manganese compound. 4,087,318, Cl. 162-60.000.
Sander, Theo: *See*—
Laue, Karl Heinrich; Sander, Theo; Sauder, Peter; and Uckert, Gotthard, 4,087,250, Cl. 23-262.000.
Sandermann, Wilhelm; Eggensperger, Heinz; and Diehl, Karl-Heinz, to Sterling Drug Inc. Octahydro-N-[(trichloromethyl)thio]-naphthalenedicarboximides. 4,087,540, Cl. 424-274.000.
Sanders, David E.; Anderson, Alfred T.; and Gordy, Robert S., to E-Systems, Inc. Carrier lock detector. 4,087,628, Cl. 178-88.000.
Sandner, Helmut Gustav, to Du Pont de Nemours, E. I., and Company. Method for toning tacky surfaces. 4,087,279, Cl. 96-1.0SD.
Sandoz Ltd.: *See*—
Greve, Manfred; and Moser, Helmut, 4,087,244, Cl. 8-41.00R.
Ott, Hans; and Suess, Rudolf, 4,087,530, Cl. 424-258.000.
Sandvik, Eystein Edmund; and Stromme, Otto Johannes, to Ardal og Sunndal Verk a.s. Potshell for electrolytic aluminum reduction cell. 4,087,345, Cl. 204-243.00R.
Sano, Hironobu: *See*—
Nakayama, Yoshiki; Sano, Hironobu; Okamura, Sataro; and Hirao, Kazunari, 4,087,442, Cl. 260-326.11R.
Sansonetti, Coretta. Heated mitten. 4,087,675, Cl. 219-211.000.
Sanyo Electric Co., Ltd.: *See*—
Nishimura, Itsuro; and Takahashi, Yoshimasa, 4,087,835, Cl. 358-60.000.
Sargent, Michael R.; Schwartz, Robert G.; and Brown, John G., Jr., to Monsanto Company. Mechanical and thermal treatment of steel wire. 4,087,295, Cl. 148-143.000.
Sarychev, Jury Pavlovich: *See*—
Korenblit, Izya Yakovlevich; Kaplansky, Arkady Fridmanovich; Arkhipov, Vladimir Viktorovich; Frenkel, Andrei Filippovich; and Sarychev, Jury Pavlovich, 4,087,200, Cl. 415-199.200.
Sasaki, Singo: *See*—
Toyota, Yoshiho; Sasaki, Singo; Atsumi, Katsuyoshi; and Nakagi, Akio, 4,087,479, Cl. 260-835.000.
Sasaki, Takehiko: *See*—
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Sasaki, Yoshiyuki: *See*—
Hino, Hajime; Sasaki, Yoshiyuki; Sekiguthi, Toshio; and Yao, Masaaki, 4,086,751, Cl. 57-157.0TS.
Sato, Kazuyuki, to Tokyo Shibaura Electric Co., Ltd. Data input control system. 4,087,640, Cl. 179-15.00A.
Sato, Kazuyuki: *See*—
Kinoshita, Tsuneo; and Sato, Kazuyuki, 4,087,854, Cl. 364-200.000.
Sato, Ken: *See*—
Takahashi, Masahiro; Miyashita, Teruo; Morita, Akira; and Sato, Ken, 4,087,341, Cl. 204-129.430.
Sato, Yo, to Kabushiki Kaisha Sato Kenkyusho. Supporting device for a rolled strip of labels, or the like. 4,087,057, Cl. 242-68.300.
Sato, Yoshio; and Ikeda, Kazuhiro, to Nippon Telegraph & Telephone Public Corporation; and Nippon Electric Co., Ltd. Clock regenerator comprising a reversible shift register and a controllable frequency divider. 4,087,627, Cl. 178-69.100.
Satzinger, Gerhard; Hartenstein, Johannes; Herrmann, Manfred; and Heldt, Wolfgang, to Warner-Lambert Company. Treatment of cranial dysfunctions using novel cyclic amino acids. 4,087,544, Cl. 424-305.000.
Sauder, Peter: *See*—
Laue, Karl Heinrich; Sander, Theo; Sauder, Peter; and Uckert, Gotthard, 4,087,250, Cl. 23-262.000.
Sauer, Hans; and Kloss, Wolfgang, to Varta Batterie Aktiengesellschaft. Positive electrode for air/zinc elements. 4,087,596, Cl. 429-209.000.
Sauer, Heinrich, to Siemens Aktiengesellschaft. Housed electrical switch with slide fastening members. 4,087,669, Cl. 200-340.000.
Sauvage, Michel: *See*—
Chevallier, Rene; and Sauvage, Michel, 4,087,325, Cl. 176-65.000.
Sawada, Kaoru: *See*—
Okamoto, Tomiyasu; Nishimoto, Tsunanori; Sawada, Kaoru; Hayakawa, Koji; and Kurihara, Tomomichi, 4,087,017, Cl. 220-445.000.
Sawaoka, Eiji; and Hashimoto, Shinichi, to Tokyo Shibaura Electric Co., Ltd. Electrostatic copying apparatus with combined charging transfer unit. 4,087,170, Cl. 355-3.0CH.
Sawicki, Joseph J.; Yates, Lester R.; and Shepherd, Reeves T., to Bendix Corporation, The. ADF antenna. 4,087,817, Cl. 343-117.00R.
Sawyer, Patrick Frank, to Girling Limited. Liquid level contents indicators for vehicle hydraulic systems. 4,087,663, Cl. 200-84.00R.

Saxon, Arthur F., to Dravo Corporation. Drive assembly for the rotor of a solvent extractor. 4,086,821, Cl. 74-221.000.

Sazaki, Kounin: *See—*
Yamasaki, Tatuya; and Sazaki, Kounin, 4,087,058, Cl. 242-84.51A.

Schadle, Eugene J. Boat loading and launching carrier. 4,087,014, Cl. 214-450.000.

Schaefer, George F.: *See—*
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Schaer, Werner: *See—*
Campbell, Kenneth C.; Schaer, Werner; and Swanstrom, Harry W., 4,087,852, Cl. 364-200.000.

Schaller, Karl Heinz: *See—*
Louis, Helmut P.; Matla, Arno; Schaller, Karl Heinz; and Zimmerman, Volker, 4,087,843, Cl. 360-78.000.

Schaut, Larry Allen; and Zimbrick, Richard Alan, to Boeing Company, The. Stator bypass system for turbofan engine. 4,086,761, Cl. 60-226.00R.

Scheel, Russell H., to SI Handling Systems, Inc. Vehicle control device. 4,086,854, Cl. 104-166.000.

Schell, Lorenz P., to Olin Corporation. Method of hydrolyzing urea contained in waste water streams. 4,087,513, Cl. 423-437.000.

Scheller, Hartmut: *See—*
Domges, Gunther; Scheller, Hartmut; and Zangenfeind, Helmut, 4,087,033, Cl. 225-1.000.

Schering Corporation: *See—*
Knapp, Julius Z.; and Zeiss, John C., 4,087,184, Cl. 356-197.000.

Schier, Joseph F.; and Rosner, Robert E., to McDonnell Douglas Corporation. Method of and tools for producing superplastically formed and diffusion bonded structures. 4,087,037, Cl. 228-106.000.

Schill, John Michael. Mountable and dismountable clothes hanger bar. 4,087,006, Cl. 211-86.000.

Schiller Industries, Inc.: *See—*
Spencer, John Patrick; and Torre, Anthony Joseph, 4,087,681, Cl. 235-466.000.

Schiller, Wolfgang: *See—*
Sahm, Wilfried; Hille, Ernst; and Schiller, Wolfgang, 4,087,610, Cl. 548-305.000.

Schisler, Robert Charles: *See—*
Custer, Harry Samuel; and Schisler, Robert Charles, 4,087,343, Cl. 204-219.000.

Schlichthaerle, Gottfried: *See—*
Mietzner, Franz Georg; Buechner, Oskar; Steigerwald, Klaus; Schlichthaerle, Gottfried; and Urban, Friedrich, 4,087,602, Cl. 528-481.000.

Schlumberger Technology Corporation: *See—*
Suau, Jean, 4,087,740, Cl. 324-10.000.
Vieiro, Julio, 4,087,739, Cl. 324-10.000.

Schmidt, Horst, to Hoesch Werke Aktiengesellschaft. Device for interconnecting plates to be covered by foamed material. 4,087,310, Cl. 156-505.000.

Schmidt, Robert R.: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert R., 4,087,272, Cl. 71-120.000.

Schmitmann, Herbert, to Siemens Aktiengesellschaft. X-ray diagnostic apparatus for X-ray film photographs with an automatic exposure timer. 4,087,686, Cl. 250-322.000.

Schmukler, Seymour: *See—*
Shida, Mitsuzo; Machonis, John, Jr.; Schmukler, Seymour; and Zeitlin, Robert J., 4,087,587, Cl. 428-500.000.
Shida, Mitsuzo; Machonis, John, Jr.; Schmukler, Seymour; and Zeitlin, Robert J., 4,087,588, Cl. 428-500.000.

Schnall, Gunther: *See—*
Pfeifer, Josef; Schnall, Gunther; Aldenhoven, Klaus; and Blochl, Hanns, 4,087,178, Cl. 355-72.000.

Schneider, Irwin; Collins, William C.; Imber, Oscar; and Klein, Philipp H., to United States of America, Navy. Photodichroic crystals and preparation thereof. 4,087,374, Cl. 252-300.000.

Schneider, Louis; and Graham, David E., to GAF Corporation. Herbicidal-N-(3-amino-2,4-dinitro-6-trifluoromethylphenyl)-pyrrolidones. 4,087,270, Cl. 71-95.000.

Schneider, Louis; and Graham, David E., to GAF Corporation. Fungicidal 2,6-dinitrodiphenylthioethers. 4,087,553, Cl. 424-337.000.

Schoenholz, Daniel: *See—*
Bakal, Abraham I.; Witzel, Frank; Mackay, Donald A. M.; and Schoenholz, Daniel, 4,087,557, Cl. 426-3.000.

Schonberger, Eva: *See—*
Haber, Raphael Ralph George; and Schonberger, Eva, 4,087,427, Cl. 260-287.0AR.

Schonemann, Otto: *See—*
Luthe, Helmut; and Schonemann, Otto, 4,086,812, Cl. 73-308.000.

Schonmann, Fredi, Jr., to E. Schonmann & Co., Ag. Separator system for steam supplied apparatus. 4,087,263, Cl. 55-320.000.

Schoonover, Alan G.; Ericksen, Gary E.; and Heard, Kenneth E. Rocker arm shaft support. 4,086,887, Cl. 123-90.390.

Schramm, Jurgen: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert R., 4,087,272, Cl. 71-120.000.

Schrewe, Hans; Funderich, Hans-Dieter; and Butz, Hans, to Mannesmann Aktiengesellschaft. Withdrawal roll in continuous casting machine. 4,086,957, Cl. 165-89.000.

Schreyer, Gerd: *See—*
Prescher, Gunter; Schreyer, Gerd; Waldmann, Helmut; and Schwerdtel, Wulf, 4,087,455, Cl. 260-502.00R.

Schroetter, Wolfgang Adalbert: *See—*
Heider, Wolfgang; Heiland, Hans; and Schroetter, Wolfgang Adalbert, 4,087,667, Cl. 200-245.000.

Schubert, William L.: *See—*
Holm, Charles H.; and Schubert, William L., 4,086,976, Cl. 180-54.00A.

Schulein, Rolf G.: *See—*
Liebscher, Johannes; and Schulein, Rolf G., 4,086,677, Cl. 15-42.000.

Schultz, Hans-Joachim; and Stotz, Wolf-Gunter, to Escher Wyss GmbH. Head box having distributor pipe connected to a pulp guide block. 4,087,321, Cl. 162-343.000.

Schulz, Jay R., to Dow Corning Corporation. Self-adhering silicone compositions and preparations thereof. 4,087,585, Cl. 428-429.000.

Schutt Manufacturing Company: *See—*
Humphrey, Delby C.; and Humphrey, Robert D., 4,086,664, Cl. 2-9.000.

Schutten, Herman P.: *See—*
Hyink, Roy; Jaskolski, Stanley V.; Lade, Robert W.; Schutten, Herman P.; and Spellman, Gordon B., 4,087,848, Cl. 361-103.000.

Schwartz, Harry: *See—*
Kofsky, Harvey I.; and Warner, Glenfield, 4,086,915, Cl. 128-2.00L.

Schwartz, Robert G.: *See—*
Sargent, Michael R.; Schwartz, Robert G.; and Brown, John G., Jr., 4,087,295, Cl. 148-143.000.

Schweizerische Isola-Werke: *See—*
Mosimann, Hans; and Marti, Werner, 4,087,712, Cl. 310-215.000.

Schwendner, David A.: *See—*
Kirby, James P.; Dudley, Peggy D.; and Schwendner, David A., 4,087,702, Cl. 307-252.00B.

Schwerdtel, Wulf: *See—*
Prescher, Gunter; Schreyer, Gerd; Waldmann, Helmut; and Schwerdtel, Wulf, 4,087,455, Cl. 260-502.00R.

Scott, Howard L., to Wragg, Charles L., Jr.; Fabalon, Inc.; Wragg, Beverly; and Karen & Wendy Scott Trust, part interest to each. Method of dry lubricating the skin. 4,087,517, Cl. 424-69.000.

Scott, Jack C. Tennis ball throwing machine. 4,086,903, Cl. 124-78.000.

Scott, John William: *See—*
Buchschacher, Paul; Furst, Andor; Labler, Ludwig; Meier, Werner; and Scott, John William, 4,087,436, Cl. 260-307.00H.

Sebag, Henri: *See—*
Vanlerberghe, Guy; and Sebag, Henri, 4,087,466, Cl. 260-615.00B.

Sedley, Bruce S. Magnetic card reader. 4,087,660, Cl. 235-449.000.

Segmiller, James L.: *See—*
Yao, Alden K.; and Segmiller, James L., 4,087,560, Cl. 426-250.000.

Seifert, Hermann: *See—*
Prescher, Gunter; Weiberg, Otto; Waldmann, Helmut; and Seifert, Hermann, 4,087,454, Cl. 260-502.00R.

Seigel, Lawrence G., to United States Steel Corporation. Method for enhancing the heating efficiency of continuous slab reheating furnaces. 4,087,238, Cl. 432-18.000.

Seiko Koki Kabushiki Kaisha: *See—*
Tsuchiya, Hideo; and Kitai, Kiyoshi, 4,086,753, Cl. 58-23.00D.

Sekiguchi, Tadashi, to Hotei Kanzume Co., Ltd. Method for processing fishes. 4,087,563, Cl. 426-479.000.

Sekiguthi, Toshio: *See—*
Hino, Hajime; Sasaki, Yoshiyuki; Sekiguthi, Toshio; and Yao, Masaaki, 4,086,751, Cl. 57-137.0TS.

Sellstedt, John H.: *See—*
Klaubert, Dieter H.; Sellstedt, John H.; and Guinosso, Charles J., 4,087,606, Cl. 544-163.000.

Seragnoli, Enzo, to G. D. Societa per Azioni. Device for preparing hinge-lid packets of cigarettes for application of sealing strips and the like. 4,086,744, Cl. 53-137.000.

Sexton, Wilson B.; and Spencer, Frankie N., to Airwick Pool Products, Inc. Swimming pool cleaning device. 4,087,286, Cl. 134-167.00R.

Seyfferle, Otto: *See—*
Heiland, Hans; and Seyfferle, Otto, 4,086,977, Cl. 180-64.00A.

Shaffer, John W., to GTE Sylvania Incorporated. Radiation switch for photoflash unit. 4,087,233, Cl. 431-95.00A.

Shaffer, Robert C., to Hitco. Furfuryl alcohol modified polyester resins containing metal atoms. 4,087,482, Cl. 260-868.000.

Shah, Narendra J.: *See—*
Hall, Garth O.; Tengler, Harvey N.; and Shah, Narendra J., 4,087,069, Cl. 248-400.000.

Shamma, Maurice; and Moniot, Jerome L., to Research Corporation. Oxybisberberine and a process for its production. 4,087,426, Cl. 260-286.00R.

Shapiro, Howard E.: *See—*
Merz, Kenneth M.; and Shapiro, Howard E., 4,087,778, Cl. 338-309.000.

Sharp Kabushiki Kaisha: *See—*
Takagi, Toshinori, 4,087,720, Cl. 315-111.900.
Yonekawa, Masaji; and Sasaki, Takehiko, 4,086,754, Cl. 58-50.00R.

Shaw, Arthur R., to General Motors Corporation. Dual circuit quick take-up master cylinder. 4,086,770, Cl. 60-562.000.

Shaw, Leslie Ralph; and Morris, Barry Stanley, to Bloxwich Lock and Stamping Company Limited, The. Fastening mechanism for doors. 4,087,122, Cl. 292-218.000.

Shell Oil Company: *See—*
Dilgren, Richard E.; Hirasaki, George J.; Hill, Harold J.; and Whitten, Derrill G., 4,086,964, Cl. 166-272.000.

Shen, Tsung-Ying; and Jones, Howard, to Merck & Co., Inc. Sulphonic acid containing indenyl derivatives. 4,087,549, Cl. 424-315.000.

Shepard, Clayton L. Folding chair. 4,087,128, Cl. 297-52.000.

Shephard, Margaret Claire: *See—*
Bowie, Raymond Alexander; Cox, John Michael; Farrell, Gordon Michael; and Shephard, Margaret Claire, 4,087,422, Cl. 544-251.000.
Shepherd, Reeves T.: *See—*
Sawicki, Joseph J.; Yates, Lester R.; and Shepherd, Reeves T., 4,087,817, Cl. 343-117.00R.
Sherrod, Fred A.; Howard, William L.; and Burger, Joanne D., to Dow Chemical Company, The. Process for obtaining glycols and glycerine or di- and triesters thereof from polyglycols and polyglycerine. 4,087,453, Cl. 560-240.000.
Sherwin, Martin Barry; and Hansen, Robert, to Chem Systems, Inc. Catalyst recovery process. 4,087,623, Cl. 560-246.000.
Sherwood Medical Industries Inc.: *See—*
Dodge, Larry H., 4,086,925, Cl. 128-272.000.
Shibata, Yukio: *See—*
Matsushita, Toshiaki; and Shibata, Yukio, 4,086,763, Cl. 60-282.000.
Shida, Mitsuzo; Machonis, John, Jr.; Schmukler, Seymour; and Zeitlin, Robert J., to Chemplex Company. Adhesive blends. 4,087,587, Cl. 428-500.000.
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Shields, James E., to Eli Lilly and Company. Somatostatin analogs and intermediates thereto. 4,087,390, Cl. 260-8.000.
Shields, Theodore C., to Ashland Oil, Inc. Multiple metal deactivators, method for preparing, and use thereof. 4,087,256, Cl. 44-73.000.
Shields, Walter A. Apparatus for die cutting sheets of die cuttable material. 4,086,834, Cl. 83-326.000.
Shimada, Kiyohiro: *See—*
Mutai, Masahiko; Mada, Mitsuo; Nakajima, Kei; Shimada, Kiyohiro; and Iijima, Takashi, 4,087,559, Cl. 426-43.000.
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Shimizu, Masahiko: *See—*
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Shimizu, Nobuo: *See—*
Onishi, Takanori; Kitahara, Osamu; Shimizu, Nobuo; Suzuki, Takio; Yamashirodani, Tetsuo; and Ohta, Yozo, 4,087,492, Cl. 261-41.00D.
Shimogawa, Toshiaki; Uchiyamada, Kameo; and Morita, Masayuki, to Nippon Soken, Inc. Safety seat belt system. 4,087,118, Cl. 280-745.000.
Shin Tohoku Chemical Industry Co., Ltd.: *See—*
Tanno, Minoru, 4,087,375, Cl. 252-301.10W.
Shinoda, Akibumi; and Shimizu, Masahiko, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Heated air dissipating device for motor use in a battery-powered forklift truck. 4,087,707, Cl. 310-63.000.
Shinshu Seiki Kabushiki Kaisha: *See—*
Futagawa, Yoshikiyo; and Kuriya, Katsumi, 4,087,861, Cl. 364-709.000.
Shirahata, Ryuji; and Kitamoto, Tatsuji, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,087,582, Cl. 428-333.000.
Shoemaker, Clifford L. Alignment and locking devices used on loading and carrying a boat on a vehicle roof. 4,087,029, Cl. 224-42.10H.
Shortes, Joan A.: *See—*
Shortes, Lois E.; and Shortes, Joan A., 4,086,980, Cl. 182-151.000.
Shortes, Lois E.; and Shortes, Joan A. Dismantling ladder. 4,086,980, Cl. 182-151.000.
Shriver, Joe E.: *See—*
Greiner, James G.; Brelsford, John E.; and Shriver, Joe E., 4,086,749, Cl. 56-98.000.
Shumate, Donald L., to Permco, Inc. Flow diverter pressure plate. 4,087,216, Cl. 418-74.000.
Shuster, Edward J.: *See—*
Pittet, Alan Owen; Klaiber, Erich Manfred; Vock, Manfred Hugo; Shuster, Edward J.; and Vinals, Joaquin, 4,086,927, Cl. 131-17.00R.
SI Handling Systems, Inc.: *See—*
Newbegin, John L., 4,086,855, Cl. 104-172.0BT.
Scheel, Russell H., 4,086,854, Cl. 104-166.000.
Sidillo, Michael: *See—*
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Siegel, Arthur Richard: *See—*
Canavello, Benjamin John; Hatzakis, Michael; Siegel, Arthur Richard; and Watters, Connell, 4,086,870, Cl. 118-52.000.
Siemens Aktiengesellschaft: *See—*
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Bahker, Friedrich; and Kohler, Ernst Jurgen, 4,087,066, Cl. 246-167.00R.
Bahker, Friedrich; and Kohler, Ernst Jurgen, 4,087,067, Cl. 246-167.00R.
Haeder, Wolfgang, 4,087,190, Cl. 403-313.000.
Henkel, Hans-Joachim; and De Bucs, Eugen Szabo, 4,086,877, Cl. 123-1.00A.
Heywang, Walter, 4,087,716, Cl. 310-332.000.
Hofmann, Ruediger, 4,087,044, Cl. 235-301.000.
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Sauer, Heinrich, 4,087,669, Cl. 200-340.000.
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von Fabris, Wilhelm; and Wentzel, Peter, 4,087,710, Cl. 310-168.000.
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Silva, John Cruze, Jr. Adjustable tow dolly. 4,087,008, Cl. 214-86.00A.
Silverman, Arthur: *See—*
Silvestris, Louis F.; and Silverman, Arthur, 4,087,147, Cl. 339-21.00R.
Silvestris, Louis F.; and Silverman, Arthur, to Keene Corporation. Track lighting system connector. 4,087,147, Cl. 339-21.00R.
Simmons, James. Mobile broiler apparatus. 4,086,849, Cl. 99-357.000.
Sinclair Radio Laboratories Limited: *See—*
Furneaux, Frederick Arthur S., 4,087,768, Cl. 333-83.00R.
Singalewitch, Joseph Don; and Reinhardt, Winifred, to International Telephone & Telegraph Corporation. Photoresist stripper systems. 4,087,370, Cl. 252-143.000.
Singer Company, The: *See—*
Ketterer, Stanley Joseph; and Adams, Kenneth Douglas, 4,086,861, Cl. 112-158.00E.
Singh, Balwant: *See—*
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Pfleger, Klaus; Zacher, Wieland; Boettcher, Klaus; Skorczyk, Ronald; Buechner, Oskar; and Mietzner, Franz Georg, 4,087,601, Cl. 526-329.000.
Slaughter, William George Frederick; Pledger, Peter William; and Lowry, John Patrick Auriole, to Post Office, The. Injection welding apparatus. 4,087,508, Cl. 264-262.000.
Smarrella, Eugene R.: *See—*
Hansen, Lloyd B.; and Smarrella, Eugene R., 4,086,972, Cl. 175-65.000.
Smith, Alexander M., II, to Fiberwoven Corporation, The. Apparatus for relaxing or loosening needled textile fabrics. 4,086,687, Cl. 28-103.000.
Smith, Gary L., to General Motors Corporation. Independent suspension system. 4,087,103, Cl. 280-96.100.
Smith, Geoffrey H.: *See—*
Takahashi, Akio; Smith, Geoffrey H.; Rushton, Brian M.; and Annis, Myron C., 4,087,480, Cl. 260-847.000.
Smith, George E., Jr.: *See—*
Moore, Leon; and Smith, George E., Jr., 4,086,876, Cl. 119-5.000.
Smith, Herman W., to Upjohn Company, The. Inter-M-phenylene-13,14-didehydro-PGF$_1$ compounds. 4,087,617, Cl. 560-55.000.
Smith, Herman W., to Upjohn Company, The. Inter-m-phenylene-13,14-didehydro-PGE$_1$, compounds. 4,087,618, Cl. 560-53.000.
Smith, Horace L., Jr., to Smitherm Industries, Inc. Rotary heat exchangers. 4,086,691, Cl. 29-157.30R.
Smith, Joseph L., Jr.: *See—*
Kirtley, James L., Jr.; and Smith, Joseph L., Jr., 4,087,711, Cl. 310-184.000.
Smith, Lloyd T., to S/V Tool Company, Inc. Ratchet driver. 4,086,831, Cl. 81-62.000.
Smith, Nathan L.; and Rajadhyaksha, Vithal J., to Nelson Research & Development Company. Azido-triazines. 4,087,609, Cl. 544-211.000.
Smith, Rory James Maxwell; and Mackie, Gordon John, to Procter & Gamble Company, The. Foaming and conditioning protein-containing detergent compositions. 4,087,518, Cl. 424-70.000.
Smith, Warren K., to United States of America, Navy. Compound memory engine. 4,086,769, Cl. 60-527.000.
Smitherm Industries, Inc.: *See—*
Smith, Horace L., Jr., 4,086,691, Cl. 29-157.30R.
Smithers, Michael James: *See—*
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SmithKline Instruments, Incorporated: *See—*
Reynolds, Charles A., 4,086,818, Cl. 73-620.000.
Smrt, Thomas J. Spraying apparatus. 4,087,048, Cl. 239-146.000.
Smulders, Herman Adrianus Godefridus: *See—*
Chermin, Hubertus Mathias Jozef; and Smulders, Herman Adrianus Godefridus, 4,087,723, Cl. 315-207.000.
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Wilcox, Wayne E.; and Foster, Frank L., 4,086,939, Cl. 137-614.030.
Societa Italiana Telecomunicazioni SIEMENS S.p.A.: *See—*
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S.A. Etablissements Francois Salomon & Fils: *See—*
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Societe Generale de Constructions Electriques et Mecaniques Alsthom S.A.: *See—*
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Societe Nationale Elf Aquitaine (Production): *See—*
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SOI: *See—*
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Solomon, Paul W., to Phillips Petroleum Company; and Phillips Petroleum Company. Preparation of grignard reagents of halodienes and preparation of dienols. 4,087,468, Cl. 568-807.000.

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Song, Ching-Long, to North Electric Company. Digital-to-analog converter for a communication system. 4,087,754, Cl. 325-38.00B.
Sony Corporation: *See—*
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Spaeth, Horst M.: *See—*
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Spano, Joseph Frank: *See—*
Towns, Edward Johnson; Brown, Edward Morris; Dykstra, Leonard; Spano, Joseph Frank; and Proctor, John Daniel, 4,087,016, Cl. 215-211.000.
Sparks, William F., to Macfield Texturing, Inc. Safety guard for the blade of carton openers. 4,086,698, Cl. 30-2.000.
Speece, Richard E. Pressurized gas transfer system with dilution control. 4,087,262, Cl. 55-52.000.
Spellman, Gordon B.: *See—*
Hyink, Roy; Jaskolski, Stanley V.; Lade, Robert W.; Schutten, Herman P.; and Spellman, Gordon B., 4,087,848, Cl. 361-103.000.
Spence, Henry Joseph, to Wallace Murray Corporation. Rolling dam temperature controlled hydraulic coupling. 4,086,988, Cl. 192-58.00B.
Spence, Henry Joseph, to Wallace Murray Corporation. Temperature controlled hydraulic coupling with moveable dam. 4,086,989, Cl. 192-58.00B.
Spence, Henry Joseph, to Wallace Murray Corporation. Temperature controlled hydraulic coupling with separate tube. 4,086,990, Cl. 192-58.00B.
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Spencer, John Patrick; and Torre, Anthony Joseph, to Schiller Industries, Inc. Asynchronous to synchronous converter. 4,087,681, Cl. 235-466.000.
Sperry Rand Corporation: *See—*
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Ruby, Joseph H., 4,086,804, Cl. 73-4.00R.
Spirig, Ernst. Intruder alarm systems. 4,087,814, Cl. 343-5.0PD.
Spokas, Romas B., to Borg-Warner Corporation. Friction clutches. 4,086,995, Cl. 192-111.00B.
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Standard Oil Company, The: *See—*
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Standard Oil Company (Indiana): *See—*
Fielding, Ivor R.; and Poppe, Wassily, 4,087,486, Cl. 260-897.00A.
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Hall, Johnce E.; and Greenfield, William D., 4,086,971, Cl. 175-7.000.
Lai, Chiang-Chun, 4,086,777, Cl. 61-97.000.
Mufti, Irshad R., 4,087,741, Cl. 324-10.000.
Stanford Research Institute: *See—*
Edelstein, Stephen A.; Lorents, Donald C.; McCusker, Michael V.; and Gallagher, Thomas F., 4,087,765, Cl. 331-94.50G.
Starikova, Olga Fedorovna: *See—*
Gurvich, Yakov Abramovich; Grinberg, Alexandr Afroimovich; Liakumovich, Alexandr Grigorievich; Michurov, Jury Ivanovich; Starikova, Olga Fedorovna; Yanshevsky, Vladimir Avgustovich; Kumok, Simona Tevievna; Styskin, Evgeny Lvovich; and Rutman, Grigory Iosifich, 4,087,469, Cl. 568-723.000.
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Staschik, Gunter: *See—*
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Statham, John Arnold. Mooring system. 4,086,865, Cl. 114-230.000.
Stauffer Chemical Company: *See—*
Baker, Don R.; and Walker, Francis H., 4,087,277, Cl. 71-105.000.
Stauter, John C.; and Tolley, William K., to UOP Inc. Production of metallic lead. 4,087,340, Cl. 204-117.000.
Stayner, Vance A. Silica flour containing reinforced resin compositions and articles formed thereof. 4,087,401, Cl. 260-40.00R.
Steadman, Brian Lee, to Avon Medicals Limited. Method of forming a flow restrictor. 4,087,301, Cl. 156-198.000.
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Steenken, Gerhard E. W. K., to Akzona Incorporated. Process for extracting metals from spent desulphurization catalysts. 4,087,510, Cl. 423-53.000.
Steffen, Ronald W., to Dickey-john Corporation. Wheel interference monitor. 4,087,783, Cl. 340-52.00R.
Steiger, Anton, to Sulzer Brothers Ltd. Reciprocating internal-combustion engine charged with fuel in powder form. 4,086,883, Cl. 123-23.000.
Steiger Tractor Inc.: *See—*
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Steigerwald, Klaus: *See—*
Mietzner, Franz Georg; Buechner, Oskar; Steigerwald, Klaus; Schlichthaerle, Gottfried; and Urban, Friedrich, 4,087,602, Cl. 528-481.000.
Steiman, Wolf. Leakproof pump for hand-held dispensers. 4,087,025, Cl. 222-321.000.
Steinegger, Alfred; and Moser, Robert, to Swiss Aluminium Ltd. Apparatus for filtering metal melts. 4,087,080, Cl. 266-88.000.
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Stenabaugh, Donald D.: *See—*
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Stephan, Erwin A., to Eli Lilly and Company. 2-Phenyl-5-benzoxazolylalkanoic acid purification process. 4,087,437, Cl. 260-307.00D.
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Stephenson, Raymond Owen: *See—*
Figov, Murray; Kent, Alan Walter; Stephenson, Raymond Owen; and Watts, Peter Edward, 4,086,853, Cl. 101-463.000.
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Sterner, Karl Thore. Supporting structure for fish nets or the like. 4,086,874, Cl. 119-3.000.
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Stieger, Helmut John. Fluid coupling. 4,086,766, Cl. 60-330.000.
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Stookey, Stanley Donald; and Wedding, Brent Merle, to Corning Glass Works. Method for enhancing the image contrast in color television picture tubes. 4,087,280, Cl. 96-27.00R.
Stormon, Harry J. Apparatus for mounting a hand-held paving breaker on backhoe attachments. 4,087,010, Cl. 214-145.00R.
Stotz, Wolf-Gunter: *See—*
Schultz, Hans-Joachim; and Stotz, Wolf-Gunter, 4,087,321, Cl. 162-343.000.
Strahorn, David F.; Goldstein, Roger F.; and Cash, Dennis R., to Chevron Research Company. Fluids mixing and distributing apparatus. 4,087,252, Cl. 23-288.00R.
Strathoff, Dieter; Winter, Karl; and Staschik, Gunter, to Ceagfilter und Entstaubungstechnik GmbH. Apparatus for sorption filters and method for operating them. 4,087,260, Cl. 55-28.000.
Straube, Harold M.: *See—*
Joslow, David L.; Bloch, Alan; Henthorn, Lincoln; and Straube, Harold M., 4,087,643, Cl. 179-15.0AL.
Strawick, Raymond L. Chemi-luminescent flying saucer toy. 4,086,723, Cl. 46-74.00D.
Stricker, John G.; and Purnell, John G., to United States of America, Navy. Boundary layer inlets and transverse mounted pumps for water jet propulsion systems. 4,086,867, Cl. 115-14.000.
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Strzalka, Marion W. Glue applicator. 4,087,303, Cl. 156-357.000.
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Suau, Jean, to Schlumberger Technology Corporation. Spherical focusing method and apparatus for determining the thickness of a zone in an earth formation traversed by a borehole. 4,087,740, Cl. 324-10.000.
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Suechting, William G., to Hein-Werner Corporation. Hydraulic pumping device with pneumatic actuation. 4,087,210, Cl. 417-401.000.
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Sugai, Yoshiro, to Pioneer Electronic Corporation. Noise limiting circuit for FM stereo receiver. 4,087,641, Cl. 179-15.0BT.

Sugar Supply, Inc.: *See—*
Arruza, Antonio E., 4,086,676, Cl. 9-7.000.

Sugerman, Gerald: *See—*
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Sugihara, Shigeru: *See—*
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Sugimoto, Masaaki; Matsumoto, Yoshio; Ikeya, Nobushige; and Hasegawa, Koichi, to Mitsubishi Chemical Industries Ltd. Process for preparing tacky polyolefin film. 4,087,505, Cl. 264-95.000.

Sugio, Akitoshi; Ohtsuki, Yoshiharu; Umemura, Toshikazu; and Mizutani, Makoto, to Mitsubishi Gas Chemical Company, Inc. Process for preparing oxymethylene polymers. 4,087,411, Cl. 260-67.0FP.

Sugiura, Yukio: *See—*
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Sullivan, Kevin J., to Corning Glass Works. Anticoagulant coating method. 4,087,567, Cl. 427-2.000.

Sullivan, Thomas E.; and Pardini, John A., to United States of America, Energy. Pipe connector. 4,087,323, Cl. 176-38.000.

Sulzer Brothers Ltd.: *See—*
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Sumitomo Chemical Company, Limited: *See—*
Miki, Tamotsu; Imai, Akio; and Kobayashi, Yuji, 4,087,484, Cl. 260-880.00B.

Sumiyoshi, Masaharu: *See—*
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Sunjic, Vitomir: *See—*
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Supp, Emil: *See—*
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Suski, Michael D.; and Suski, Michael R. Bow string attached hand release anchor. 4,086,904, Cl. 124-90.000.

Suski, Michael R.: *See—*
Suski, Michael D.; and Suski, Michael R., 4,086,904, Cl. 124-90.000.

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Suzuki, Shigeto, to Chevron Research Company. Process for the production of ethylene glycol. 4,087,470, Cl. 568-864.000.

Suzuki, Takio: *See—*
Onishi, Takanori; Kitahara, Osamu; Shimizu, Nobuo; Suzuki, Takio; Yamashirodani, Tetsuo; and Ohta, Yozo, 4,087,492, Cl. 261-41.00D.

Suzuki, Yasuo; Tamura, Akira; Sugihara, Shigeru; and Tezuka, Toshiro, to Bridgestone Tire Company Limited. Radial tire for heavy load vehicles. 4,086,948, Cl. 152-355.000.

Swadley, Gerald L., to Sundstrand Corporation. Thermally actuated disconnect coupling. 4,086,991, Cl. 192-82.00T.

Swain, Ronald L.: *See—*
Holcombe, Cressie E., Jr.; Swain, Ronald L.; Banker, John G.; and Edwards, Charlene C., 4,087,573, Cl. 427-372.00R.

Swaisgood, Harold E., to Research Triangle Institute. Purification and immobilization of sulfhydryl oxidase. 4,087,328, Cl. 195-63.000.

Swanson, Robert L.; and Blake, William J. Telescoping device for retrieving fishing lures. 4,086,718, Cl. 43-17.200.

Swanstrom, Harry W.: *See—*
Campbell, Kenneth C.; Schaer, Werner; and Swanstrom, Harry W., 4,087,852, Cl. 364-200.000.

Swingle, James C.: *See—*
George, E. Victor; Krupke, William F.; Murray, John R.; Powell, Howard T.; Swingle, James C.; Turner, Charles E., Jr.; and Rhodes, Charles K., 4,087,763, Cl. 331-94.5PE.

Swiss Aluminium Ltd.: *See—*
Steinegger, Alfred; and Moser, Robert, 4,087,080, Cl. 266-88.000.

Syntex (U.S.A.) Inc.: *See—*
Marx, Michael; and Reisdorff, Josef H., 4,087,438, Cl. 260-307.00G.
Muchowski, Joseph M.; and Kluge, Arthur F., 4,087,539, Cl. 424-274.000.

Syracuse University Research Corporation: *See—*
Szabo, Karoly, 4,087,537, Cl. 424-273.00R.

Szabo, Karoly, to Syracuse University Research Corporation. 3-(Haloalkoxyalkyl)-carbamyl benzimidazolyl carbamates and their use as pesticides. 4,087,537, Cl. 424-273.00R.

Szczepanski, Harry. Airspace type spray dispenser. 4,087,023, Cl. 222-209.000.

Takabayashi, Teruo, to Kohshoh Limited. Plastic clip. 4,086,686, Cl. 24-250.000.

Takacs, Joseph E.: *See—*
Takacs, Victor C.; and Takacs, Joseph E., 4,087,194, Cl. 408-199.000.

Takacs, Victor C.; and Takacs, Joseph E., to Triangle Grinding, Inc. Cutting tool. 4,087,194, Cl. 408-199.000.

Takagi, Kinzo. Variable delivery hydraulic equipment. 4,086,845, Cl. 91-483.000.

Takagi, Toshinori, to Sharp Kabushiki Kaisha. Multi-beam, multi-aperture ion sources of the beam-plasma type. 4,087,720, Cl. 315-111.900.

Takahashi, Akio; Smith, Geoffrey H.; Rushton, Brian M.; and Annis, Myron C., to Hooker Chemicals & Plastics Corporation. Oxyalkylated novolac modifiers for polyvinyl halide compositions. 4,087,480, Cl. 260-847.000.

Takahashi, Choku; and Kinoshita, Katsutoshi, to New Nippon Electric Co., Ltd. Tape recorders with cassette loading and ejecting mechanisms. 4,087,844, Cl. 360-96.000.

Takahashi, Koji: *See—*
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, 4,087,366, Cl. 252-62.900.

Takahashi, Masahiro; Miyashita, Teruo; Morita, Akira; and Sato, Ken, to Nippon Light Metal Research Laboratory Ltd. Process for electrograining aluminum substrates for lithographic printing. 4,087,341, Cl. 204-129.430.

Takahashi, Yoshimasa: *See—*
Nishimura, Itsuro; and Takahashi, Yoshimasa, 4,087,835, Cl. 358-60.000.

Takahasi, Riyota; Yamada, Takayosi; Kimura, Makoto; and Yosikawa, Seiji, to Nippon Steel Corporation. Apparatus for changing width of a cast piece in a continuous casting operation. 4,086,951, Cl. 164-73.000.

Takano, Shuntaro: *See—*
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,087,424, Cl. 260-268.00C.

Takashima, Okuta: *See—*
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,087,424, Cl. 260-268.00C.

Takenoya, Hideaki: *See—*
Makabe, Hachiro; Watanabe, Kazuo; Takenoya, Hideaki; Kakinuma, Toshihide; and Kume, Toshiaki, 4,086,862, Cl. 112-158.00E.

Takeuchi, Tsugio: *See—*
Okumoto, Tadaoki; Takeuchi, Tsugio; and Tsuge, Shin, 4,087,249, Cl. 23-253.0PC.

Takewell, Robert B., to J. M. Huber Corporation. Process for pelletizing wet siliceous particulates. 4,087,254, Cl. 23-313.00R.

Talbert, Miles E.; and Walsh, James R., to Thomasville Products, Inc. Reinforced edge construction for cushions. 4,086,675, Cl. 5-355.000.

Tamai, Mitsuru: *See—*
Asano, Isamu; Tamai, Mitsuru; Yuhara, Tadanori; and Yasuhara, Takeshi, 4,086,815, Cl. 73-721.000.

Tamm, Paul W.: *See—*
Langlois, Gordon E.; and Tamm, Paul W., 4,087,347, Cl. 208-11.00R.

Tammaru, Tarmo: *See—*
Lescinsky, Frank William; and Tammaru, Tarmo, 4,087,786, Cl. 340-146.1AB.

Tamura, Akira: *See—*
Suzuki, Yasuo; Tamura, Akira; Sugihara, Shigeru; and Tezuka, Toshiro, 4,086,948, Cl. 152-355.000.

Tamura, Motohiko: *See—*
Uda, Kazumi; Tamura, Motohiko; Nishiura, Ichiro; and Fujiike, Hiroshi, 4,087,208, Cl. 417-54.000.

Tamura, Tetsuomi; Mizutani, Koichi; and Matsuura, Toshiharu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Evaporated fuel feed control device for an internal combustion engine. 4,086,897, Cl. 123-136.000.

Tanaka, Kojiro, to Kabushiki Kaisha Daini Seikosha. Switching system. 4,087,665, Cl. 200-153.0LB.

Tanaka, Shinsaku; and Yamanaka, Takashi, to Tanashin Denki Co., Ltd. Automatic cartridge-rejecting apparatus for a cartridge tape-playing device. 4,087,841, Cl. 360-71.000.

Tanaka, Taro: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,086,885, Cl. 123-32.0ST.

Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, to TDK Electronic Company. Method of preparing a piezoelectric ceramic composition. 4,087,366, Cl. 252-62.900.

Tanaka, Yukiyasu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,086,885, Cl. 123-32.0ST.

Tanashin Denki Co., Ltd.: *See—*
Tanaka, Shinsaku; and Yamanaka, Takashi, 4,087,841, Cl. 360-71.000.

Taneda, Teiichi; Sugiura, Yukio; Motoki, Toshio; Miyatera, Hiroyuki; and Oishi, Goichi, to Nippon Hoso Kyokai; and Yokohama Cinema Laboratories Inc. Optical sound recording system with inversely polarized sound signals. 4,087,651, Cl. 179-100.30R.

Tani Denki Kogyo Kabushiki Kaisha: *See—*
Akiyama, Masaki; and Tani, Okie, 4,087,636, Cl. 179-2.0EA.

Tani, Okie: *See—*
Akiyama, Masaki; and Tani, Okie, 4,087,636, Cl. 179-2.0EA.

Taniguchi, Hiroyoshi; and Igawa, Takao, to Ricoh Co., Ltd. Lithographic printing plate. 4,087,584, Cl. 428-422.000.

Taniguchi, Toru, to Nikku Industry Co., Ltd. System for automatically transferring carbon electrodes from a drying palette onto a pitch impregnation palette. 4,087,011, Cl. 214-152.000.

Tanno, Minoru, to Shin Tohoku Chemical Industry Co., Ltd. Method for treating radioactive waste water. 4,087,375, Cl. 252-301.10W.

Taper Line, Incorporated: *See—*
Keen, Ralph Otto, 4,086,946, Cl. 151-21.00C.

Taylor, James M.: *See*—
Wickman, Harold C.; and Taylor, James M., 4,086,814, Cl. 73-717.000.
Tazuma, James J.; and Bergomi, Angelo, to Goodyear Tire & Rubber Company, The. Method of reducing the α-acetylene content of hydrocarbon. 4,087,477, Cl. 260-681.50R.
TDK Electronic Company: *See*—
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, 4,087,366, Cl. 252-62.900.
Tebbutt, Charles Norman, to Metal Box Limited. Tamper proof seal for a closure. 4,087,018, Cl. 220-257.000.
Tecumseh Products Company: *See*—
von Kaler, Roland L., 4,086,826, Cl. 74-713.000.
Teichert, Allen L.; and Chambers, William W., to Robertshaw Controls Company. Automatic fuel ignition system with redundant flame sensing. 4,087,229, Cl. 431-43.000.
Teijin Limited: *See*—
Hino, Hajime; Sasaki, Yoshiyuki; Sekiguthi, Toshio; and Yao, Masaaki, 4,086,751, Cl. 57-157.0TS.
Telaris Telecommunications Inc.: *See*—
Hayes, James Christopher; and Tunzi, Burton Ralph, 4,087,638, Cl. 179-2.00E.
Tele Vend Inc.: *See*—
Krause, Stephen R.; Goldman, Max; and Gnat, Emanuel, 4,087,092, Cl. 273-138.00A.
Temple, Victor A. K., to General Electric Company. Self-protecting semiconductor device. 4,087,834, Cl. 357-38.000.
Tengler, Harvey N.: *See*—
Hall, Garth O.; Tengler, Harvey N.; and Shah, Narendra J., 4,087,069, Cl. 248-400.000.
Tenneco Inc.: *See*—
Balluff, Robert N., 4,087,039, Cl. 228-173.00R.
Terada, Osamu; and Uwajima, Takayuki, to Kyowa Hakko Kogyo Co., Ltd. Creatinine desimidase and its method of production. 4,087,329, Cl. 195-66.00R.
Terman, Lewis Madison, to International Business Machines Corporation. Digital-to-analog and analog-to-digital converter circuit. 4,087,812, Cl. 340-347.0AD.
Terminal Data Corporation: *See*—
Rothbart, Michael; and Petterson, Tor H., 4,087,166, Cl. 353-26.00A.
Tetenborg, Konrad: *See*—
Achelpohl, Fritz; and Tetenborg, Konrad, 4,086,742, Cl. 53-29.000.
Texaco Exploration Canada Ltd.: *See*—
Braden, William B., Jr.; and Agnew, George H., 4,086,961, Cl. 166-245.000.
Texaco Inc.: *See*—
Braden, William B., Jr.; and Agnew, George H., 4,086,961, Cl. 166-245.000.
Itria, Oswald A.; and Todd, James D., 4,087,780, Cl. 340-7.00R.
Texas Instruments Incorporated: *See*—
Grenier, Aime J., 4,087,772, Cl. 335-202.000.
Tezuka, Toshiro: *See*—
Suzuki, Yasuo; Tamura, Akira; Sugihara, Shigeru; and Tezuka, Toshiro, 4,086,948, Cl. 152-355.000.
Th. Goldschmidt AG: *See*—
Rossmy, Gerd; and Langenhagen, Rolf-Dieter, 4,087,448, Cl. 260-448.20E.
Theis, James V., Jr., to Hollymatic Corporation. Speed governed rotary device. 4,087,198, Cl. 415-82.000.
Theis, James V., Jr.: *See*—
Davis, Lynn M.; and Theis, James V., Jr., 4,086,683, Cl. 17-25.000.
Theologos, John James: *See*—
Gammarino, Rudolph Ronald; and Theologos, John James, 4,086,711, Cl. 35-25.000.
Thermo Electron Corporation: *See*—
Poirier, Victor L., 4,086,665, Cl. 3-1.400.
Theurer, Josef, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft G.m.b.H. Apparatus for removing a tamping tool from its holder. 4,086,692, Cl. 29-252.000.
Thiel, Max: *See*—
Braun, Franz; Stach, Kurt, deceased; Plattner, Werner, executor; Thiel, Max; Sponer, Gisbert; and Dietmann, Karl, 4,087,520, Cl. 424-177.000.
Thomas, Albert Raymond. Vane support assembly for rotary type positive displacement apparatus. 4,087,217, Cl. 418-258.000.
Thomas, Klaus: *See*—
Curtze, Jurgen; Thomas, Klaus; Ost, Walter; and Drandarewski, Christo Assenov, 4,087,533, Cl. 424-269.000.
Thomas, Manuel Andrew; and Cogan, Jerry Albert, Jr., to Milliken Research Corporation. Polymer-printed fabric and method for producing same. 4,087,243, Cl. 8-31.000.
Thomasville Products, Inc.: *See*—
Talbert, Miles E.; and Walsh, James R., 4,086,675, Cl. 5-355.000.
Thompson, Charles E., to Huyck Corporation. Biplanar papermaker's belt. 4,086,941, Cl. 139-387.00R.
Thompson, LeRoy R.: *See*—
Karstensen, Karl W.; Thompson, LeRoy R.; and Wenninger, James F., 4,086,759, Cl. 60-39.080.
Thomson-CSF: *See*—
Mourier, Georges, 4,087,721, Cl. 313-230.000.
Thorn, Donald C.; and Atwood, Glenn A., to University of Akron, The. Device and method for determining the presence of resonant materials. 4,087,798, Cl. 340-237.00R.
Thuchiya, Hiroshi: *See*—
Morita, Sizuo; Thuchiya, Hiroshi; and Kimura, Kiyoshi, 4,086,873, Cl. 118-658.000.
TIE/Communications, Inc.: *See*—
Hamatani, Fumikazu, 4,087,644, Cl. 179-16.00E.
Kerman, Stephen E.; Hamatani, Fumikazu; and Tsutsumi, Fumio, 4,087,649, Cl. 179-99.000.
Tinney, Francis John; and Nicolaides, Ernest D., to Parke, Davis & Company. New heptapeptides and methods for their production. 4,087,416, Cl. 260-112.5LH.
Tinney, Francis John, to Parke, Davis & Company. Hexapeptides and methods for their production. 4,087,417, Cl. 260-112.5LH.
Tinney, Francis John, to Parke, Davis & Company. Heptapeptides and methods for their production. 4,087,419, Cl. 260-112.5LH.
Tischenko, Oleg Ivanovich: *See*—
Vydrin, Vladimir Nikolaevich; Dukmasov, Vladimir Georgievich; Davlyatshin, Garifulla; and Tischenko, Oleg Ivanovich, 4,086,797, Cl. 72-20.000.
Titcomb, Stanley Carpenter: *See*—
Chen, Winston Hsong; and Titcomb, Stanley Carpenter, 4,087,825, Cl. 346-75.000.
Toda, Minoru; and Osaka, Susumu, to RCA Corporation. Method of producing optical image on chromium or aluminum film with high-energy light beam. 4,087,281, Cl. 96-36.000.
Todd, James D.: *See*—
Itria, Oswald A.; and Todd, James D., 4,087,780, Cl. 340-7.00R.
Tokico Ltd.: *See*—
Haraikawa, Tetsuo, 4,086,986, Cl. 188-73.300.
Tokita, Hideki: *See*—
Nakajima, Koe; Watanabe, Kazuo; and Tokita, Hideki, 4,086,801, Cl. 72-234.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Anbe, Yoshiharu, 4,087,859, Cl. 364-472.000.
Tokyo Shibaura Electric Co., Ltd.: *See*—
Kinoshita, Tsuneo; and Sato, Kazuyuki, 4,087,854, Cl. 364-200.000.
Noh, Akihiko, 4,087,801, Cl. 340-267.00R.
Sato, Kazuyuki, 4,087,640, Cl. 179-15.00A.
Sawaoka, Eiji; and Hashimoto, Shinichi, 4,087,170, Cl. 355-3.0CH.
Tolley, William K.: *See*—
Stauter, John C.; and Tolley, William K., 4,087,340, Cl. 204-117.000.
Toray Silicone Company, Ltd.: *See*—
Hamada, Mitsuo; Honma, Hiroshi; and Kato, Shoichi, 4,087,399, Cl. 260-37.0SB.
Torr, Calvin D. Golf club tool. 4,086,678, Cl. 15-105.000.
Torre, Anthony Joseph: *See*—
Spencer, John Patrick; and Torre, Anthony Joseph, 4,087,681, Cl. 235-466.000.
Touchette, John W.; and Appleby, Paul E., to Goodyear Tire & Rubber Company, The. Building arbor for tires and like articles having inextensible bead rings. 4,087,305, Cl. 156-401.000.
Towmotor Corporation: *See*—
Fatur, Richard N., 4,086,823, Cl. 74-474.000.
Towns, Edward Johnson; Brown, Edward Morris; Dykstra, Leonard; Spano, Joseph Frank; and Proctor, John Daniel, to Lermer Packaging Corporation. Tightly sealing safety cap. 4,087,016, Cl. 215-211.000.
Toyama Chemical Co., Ltd.: *See*—
Saikawa, Isamu; Takano, Shuntaro; Yoshida, Chosaku; Takashima, Okuta; Momonoi, Kaishu; Kuroda, Seietsu; Komatsu, Miwako; Yasuda, Takashi; and Kodama, Yutaka, 4,087,424, Cl. 260-268.00C.
Toyo Kogyo Co., Ltd.: *See*—
Kurio, Noriyuki, 4,087,099, Cl. 277-81.00R.
Morimoto, Yoshio, 4,087,116, Cl. 280-724.000.
Toyo Umpanki Co., Ltd.: *See*—
Shimazaki, Akio; and Kambe, Osamu, 4,087,101, Cl. 280-5.00A.
Toyoda Gosei Co., Ltd.: *See*—
Okumoto, Tadaoki; Takeuchi, Tsugio; and Tsuge, Shin, 4,087,249, Cl. 23-253.0PC.
Toyoda Koki Kabushiki Kaisha: *See*—
Kikuchi, Makoto; and Otsu, Ikuo, 4,086,729, Cl. 51-165.800.
Kobayashi, Akiyoshi; and Fukada, Kenshi, 4,086,730, Cl. 51-165.900.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Kuroda, Akitada, 4,086,822, Cl. 74-473.00R.
Onishi, Takanori; Kitahara, Osamu; Shimizu, Nobuo; Suzuki, Takio; Yamashirodani, Tetsuo; and Ohta, Yozo, 4,087,492, Cl. 261-41.00D.
Tamura, Tetsuomi; Mizutani, Koichi; and Matsuura, Toshiharu, 4,086,897, Cl. 123-136.000.
Toyota, Yoshiho; Sasaki, Singo; Atsumi, Katsuyoshi; and Nakagi, Akio, to Nippon Ester Co., Ltd. Heat-curable resin compositions for powder paints. 4,087,479, Cl. 260-835.000.
Traben, Josef, to Gebruder Linck Maschinen Fabrik und Eisengiesserei, Firma. Method and apparatus for the production of timber from round logs. 4,086,944, Cl. 144-3.00P.
Traina, Vincent Joseph. Aboveground sprinkling device for sprinkling system. 4,087,049, Cl. 239-267.000.
Tranter, Inc.: *See*—
Rowland, Robert S., 4,086,910, Cl. 126-271.000.
TRE Corporation: *See*—
Hoffmeister, Alfred C., 4,087,502, Cl. 264-46.400.
Trepo, Christian G., to Institut Merieux. Medicament for the treatment of hepatitis and/or acute or chronic infections due to the virus of hepatitis B. 4,087,519, Cl. 424-86.000.

Treuner, Uwe D.; and Breuer, Hermann, to E. R. Squibb & Sons, Inc. Pyrazolo[4,3-e][1,2,4]triazolo[4,3-c]pyridines. 4,087,423, Cl. 544-251.000.
Tri-Tech, Inc.: *See*—
Haydon, Arthur W., 4,087,709, Cl. 310-83.000.
Triangle Grinding, Inc.: *See*—
Takacs, Victor C.; and Takacs, Joseph E., 4,087,194, Cl. 408-199.000.
Trimble, Roy Lane, to Continental Group, Inc., The. Shirring machine mandrel. 4,086,684, Cl. 17-41.000.
TRW Inc.: *See*—
Merz, Kenneth M.; and Shapiro, Howard E., 4,087,778, Cl. 338-309.000.
Miller, Laurence Lockhart, 4,087,215, Cl. 418-61.00B.
Tseng, Hsin Fu, to Reticon Corporation. Interlaced photodiode array employing analog shift registers. 4,087,833, Cl. 357-24.000.
Tsien, Hsue C., to Exxon Research & Engineering Co. Bladeless mixer and system. 4,087,862, Cl. 366-165.000.
Tsubuko, Kazuo; Matsubayashi, Kenichi; and Kurotori, Tsuneo, to Ricoh Co., Ltd. Non-aqueous resin dispersion and method of manufacturing thereof. 4,087,393, Cl. 260-27.00R.
Tsuchiya, Hideo; and Kitai, Kiyoshi, to Kabushiki Kaisha Seikosha; Seiko Koki Kabushiki Kaisha; and Suwa Seikosha. Timepiece. 4,086,753, Cl. 58-23.00D.
Tsuge, Shin: *See*—
Okumoto, Tadaoki; Takeuchi, Tsugio; and Tsuge, Shin, 4,087,249, Cl. 23-253.0PC.
Tsuji, Nobuo: *See*—
Yamaguchi, June; Tsuji, Nobuo; Omichi, Takenori; and Yamaguchi, Teruo, 4,087,574, Cl. 427-407.00F.
Tsuji, Shoichi; Asai, Minoru; and Fujii, Yuichi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Swirl type pressure fuel atomizer. 4,087,050, Cl. 239-490.000.
Tsuruta, Masamichi: *See*—
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, 4,087,366, Cl. 252-62.900.
Tsutsumi, Fumio: *See*—
Kerman, Stephen E.; Hamatani, Fumikazu; and Tsutsumi, Fumio, 4,087,649, Cl. 179-99.000.
Tubbs, Elton H. Water closet. 4,086,668, Cl. 4-425.000.
Tubiello, Giuseppe: *See*—
Patron, Germano; Napoli, Domenico; Nardone, Franco; Ratti, Gianluigi; and Tubiello, Giuseppe, 4,087,359, Cl. 210-50.000.
Tucker, Council A., to American Telecommunications Corporation. Column and lever construction for a charactered telephone. 4,087,650, Cl. 179-100.00D.
Tulley, Margaret: *See*—
Brookes, Robert Frederick; Godson, David Henry; Greenwood, Douglas; Tulley, Margaret; and Wakerley, Stanley Brice, 4,087,269, Cl. 71-92.000.
Tunkel, Norman: *See*—
Wisotsky, Max J.; and Tunkel, Norman, 4,087,255, Cl. 44-62.000.
Tunstall, Karl N.: *See*—
Runberg, James E.; and Tunstall, Karl N., 4,087,073, Cl. 251-28.000.
Tunzi, Burton Ralph: *See*—
Hayes, James Christopher; and Tunzi, Burton Ralph, 4,087,638, Cl. 179-2.00E.
Turnbull, Paul J. Rotary engine with revolving and oscillating pistons. 4,086,879, Cl. 123-216.000.
Turner, Charles E., Jr.: *See*—
George, E. Victor; Krupke, William F.; Murray, John R.; Powell, Howard T.; Swingle, James C.; Turner, Charles E., Jr.; and Rhodes, Charles K., 4,087,763, Cl. 331-94.5PE.
U, Aung San, to International Telephone & Telegraph Corporation. Method of making direct metal contact to buried layer. 4,086,694, Cl. 29-579.000.
Uchiyamada, Kameo: *See*—
Shimogawa, Toshiaki; Uchiyamada, Kameo; and Morita, Masayuki, 4,087,118, Cl. 280-745.000.
Uckert, Gotthard: *See*—
Laue, Karl Heinrich; Sander, Theo; Sauder, Peter; and Uckert, Gotthard, 4,087,250, Cl. 23-262.000.
Uda, Kazumi; Tamura, Motohiko; Nishiura, Ichiro; and Fujiike, Hiroshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Method for compressing mixed gas consisting of combustible gas and air. 4,087,208, Cl. 417-54.000.
Ueda, Hiroshi; and Oyokota, Shigeru, to Minolta Camera Kabushiki Kaisha. Exposure indicating devices for use in multi-exposure controlled cameras. 4,087,829, Cl. 354-38.000.
Ueda, Takashi, to Kabushiki Kaisha Daini Seikosha. Apparatus for correcting second hand of electronic timepiece. 4,086,755, Cl. 58-85.500.
Ueno, Masahiro: *See*—
Joraku, Masami; Yamauchi, Koji; Kawano, Shigeyoshi; and Ueno, Masahiro, 4,087,078, Cl. 254-173.00R.
Uhlig, Albert R., to Owens-Illinois, Inc. Mold for thermal conditioning a thermoplastic parison. 4,087,227, Cl. 425-526.000.
Ullrich, Martin: *See*—
Erdmenger, Rudolf; and Ullrich, Martin, 4,087,863, Cl. 366-305.000.
Ulrich, Reinhard, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Self imaging system using a waveguide. 4,087,159, Cl. 350-96.120.
Umehara, Hidetoshi, to Mikuni Kogyo Kabushiki Kaisha. Ultrasonic air humidifying apparatus. 4,087,495, Cl. 261-81.000.
Umemura, Toshikazu: *See*—
Sugio, Akitoshi; Ohtsuki, Yoshiharu; Umemura, Toshikazu; and Mizutani, Makoto, 4,087,411, Cl. 260-67.0FP.
Unangst, Paul C.: *See*—
Brown, Richard E.; and Unangst, Paul C., 4,087,443, Cl. 260-326.12R.
Unilever Limited: *See*—
Bharucha, Kekhusroo R.; and Coleman, Michael H., 4,087,561, Cl. 426-266.000.
Union Carbide Corporation: *See*—
Lindbergh, Jon Morrow, 4,086,875, Cl. 119-3.000.
Union Oil Company of California: *See*—
Young, Donald C., 4,087,498, Cl. 264-11.000.
Union Special Corporation: *See*—
Kosrow, Robert L.; and Bohl, Alfred W., 4,086,860, Cl. 112-153.000.
United Kingdom Atomic Energy Authority: *See*—
Yi, Alberto, 4,087,672, Cl. 219-121.0LM.
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Williams, Willard R., to Williams, Inc. Load transfer apparatus for use between a tractor hitched to a trailer. 4,087,111, Cl. 280-406.00R.
Williamson, Robert D. Method and apparatus for electronic surveillance of precisely defined control zone. 4,087,802, Cl. 340-280.000.
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Winchell, Frank J.; and Winkelmann, Klaus O., to General Motors Corporation. Method of manually propelling a cambering vehicle. 4,087,104, Cl. 280-210.000.
Winchell, Frank J., to General Motors Corporation. Cambering vehicle. 4,087,106, Cl. 280-220.000.
Winchell, Frank J., to General Motors Corporation. Cambering vehicle with trailing arm seat for vehicle operator. 4,087,107, Cl. 280-220.000.
Winchell, Frank J., to General Motors Corporation. Cambering vehicle with trailing arms interconnected by spur gearing. 4,087,108, Cl. 280-221.000.
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Wiser, John A. Device for attracting and eliminating flying insects. 4,086,720, Cl. 43-113.000.
Wisotsky, Max J.; and Tunkel, Norman, to Exxon Research & Engineering Co. Copolymers of ethylene and ethylenically unsaturated monomers, process for their preparation and distillate oil containing said copolymers. 4,087,255, Cl. 44-62.000.
Witt, Wilmer E., to Koehring Company. Rotary cutting system. 4,086,748, Cl. 56-98.000.
Witte, Horst: *See*—
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Wittle, Eugene Leroy, to Parke, Davis & Company. Hexapeptides and methods for their production. 4,087,418, Cl. 260-112.5LH.
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Wulf, Helmut; Weidemann, Wolfgang; Stolz, Albert; and Volz, Wolfgang, to Daimler-Benz Aktiengesellschaft. Heating unit for automotive vehicles. 4,087,047, Cl. 237-12.30B.
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Wynn, Larry R., to Luce Industries, Inc. Console for van-type vehicles. 4,087,126, Cl. 296-37.800.
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Yagi, Yutaka, to Harima Sargyo Kabushiki Kaisha. Frictional welding method. 4,087,038, Cl. 228-112.000.
Yamada, Akitoshi; Kimura, Yoichi; and Kikuchi, Yoshinobu, to Matsushita Electric Industrial Co., Ltd. Projected sound localization headphone apparatus. 4,087,631, Cl. 179-1.00G.
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Yamashirodani, Tetsuo: *See*—
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Yoshida, Hiroshi; and Kozuka, Hajime, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Hydraulic power-steering system for vehicles. 4,086,940, Cl. 137-625.690.
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Yosikawa, Seiji: *See*—
Takahasi, Riyota; Yamada, Takayosi; Kimura, Makoto; and Yosikawa, Seiji, 4,086,951, Cl. 164-73.000.

Young, Donald C., to Union Oil Company of California. Method of producing sulfur particles. 4,087,498, Cl. 264-11.000.

Young, Robert A., to Xonics, Inc. Gaseous thin film acoustically tuned laser. 4,087,764, Cl. 331-94.50M.

Yugen Kaisha Sato Seimitsu Kanagata Seisakusho: *See*—
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Yuhara, Tadanori: *See*—
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Zabler, Erich; Heintz, Frieder; and Kopernik, Viktor, to Robert Bosch GmbH. Information display device. 4,087,804, Cl. 340-319.000.

Zabotto, Guy; Guichard, Jean-Marie; and Fournier, Daniel, to Rhone-Poulenc Industries. Method of obtaining caustic soda from a sodium chloride liquor containing sulphate ions recovered from an electrolytic cell. 4,087,253, Cl. 23-297.000.

Zacher, Wieland: *See*—
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Shida, Mitsuzo; Machonis, John, Jr.; Schmukler, Seymour; and Zeitlin, Robert J., 4,087,588, Cl. 428-500.000.

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Zimbrick, Richard Alan: *See*—
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Zwirblis, Henry G.: *See*—
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LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 2ND DAY OF MAY, 1978

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Bauer, Ronald S., to Shell Oil Company. Ambient curable saturated epoxy resin compositions. T970,004, 5-2-78, Cl. 260-18.0EP.

Douglas, Ted L.: *See*—
Palmer, Michael; and Douglas, Ted L., T970,005, Cl. 260-396.00R.

Evans, Robert F.: *See*—
Kidder, Harry E.; and Evans, Robert F., T970,002, Cl. 175-374.000.

Gautney, Joe: *See*—
Kohler, John J.; Gautney, Joe; Kim, Yong K.; and McCullough, John F., T970,008, Cl. 423-243.000.

Imperial Chemical Industries Limited: *See*—
Rose, John Brewster, T970,006, Cl. 260-591.000.

Irick, Gether, Jr.: *See*—
Zannucci, Joseph S.; and Irick, Gether, Jr., T970,001, Cl. 8-165.000.

Kidder, Harry E.; and Evans, Robert F., to Smith International, Inc. Cutting elements for drill bits. T970,002, 5-2-78, Cl. 175-374.000.

Kim, Yong K.: *See*—
Kohler, John J.; Gautney, Joe; Kim, Yong K.; and McCullough, John F., T970,008, Cl. 423-243.000.

Kohler, John J.; Gautney, Joe; Kim, Yong K.; and McCullough, John F., to Tennessee Valley Authority. Removal and recovery of sulfur oxides from gas streams with melamine. T970,008, 5-2-78, Cl. 423-243.000.

McCullough, John F.; Phillips, John F., Jr.; and Tate, Leslie R., to Tennessee Valley Authority. Uranium recovery from wet-process phosphoric acid. T970,007, 5-2-78, Cl. 423-10.000.

McCullough, John F.: *See*—
Kohler, John J.; Gautney, Joe; Kim, Yong K.; and McCullough, John F., T970,008, Cl. 423-243.000.

Newton, John Edward; and Simon, Mark Alan. Scanner repeatability error determining apparatus. T970,003, 5-2-78, Cl. 250-230.000.

Palmer, Michael; and Douglas, Ted L. Stabilization of wet p-benzoquinone with metal chelating agents. T970,005, 5-2-78, Cl. 260-396.00R.

Phillips, John F., Jr.: *See*—
McCullough, John F.; Phillips, John F., Jr.; and Tate, Leslie R., T970,007, Cl. 423-10.000.

Rose, John Brewster, to Imperial Chemical Industries Limited. Manufacture of halophenols. T970,006, 5-2-78, Cl. 260-591.000.

Shell Oil Company: *See*—
Bauer, Ronald S., T970,004, Cl. 260-18.0EP.

Simon, Mark Alan: *See*—
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Smith International, Inc.: *See*—
Kidder, Harry E.; and Evans, Robert F., T970,002, Cl. 175-374.000.

Tate, Leslie R.: *See*—
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Tennessee Valley Authority: *See*—
Kohler, John J.; Gautney, Joe; Kim, Yong K.; and McCullough, John F., T970,008, Cl. 423-243.000.
McCullough, John F.; Phillips, John F., Jr.; and Tate, Leslie R., T970,007, Cl. 423-10.000.

Zannucci, Joseph S.; and Irick, Gether, Jr. Bichromophoric compounds as ultraviolet stabilizers for dyes on polyester fabrics. T970,001, 5-2-78, Cl. 8-165.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 2ND DAY OF MAY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bayer Aktiengesellschaft: *See*—
Oertel, Harald; Zorn, Bruno; Thoma, Wilhelm; and Noll, Klaus, Re. 29,623, Cl. 260-33.8UB.

Conley, Thomas F.; and Gylland, Ernest F., Jr., to Westinghouse Electric Corp. Variable capacity multiple compressor refrigeration system. Re. 29,621, Cl. 62-196.00A.

Gylland, Ernest F., Jr.: *See*—
Conley, Thomas F.; and Gylland, Ernest F., Jr., Re. 29,621, Cl. 62-196.00A.

Lange, Karl H., to Pullman Incorporated. Apparatus and process for pellet preheating and volatile recycling in a glass making furnace. Re. 29,622, Cl. 65-27.000.

Noll, Klaus: *See*—
Oertel, Harald; Zorn, Bruno; Thoma, Wilhelm; and Noll, Klaus, Re. 29,623, Cl. 260-33.8UB.

Oak Ridge Machines: *See*—
Picker, Franck, Re. 29,620, Cl. 60-428.000.

Oertel, Harald; Zorn, Bruno; Thoma, Wilhelm; and Noll, Klaus, to Bayer Aktiengesellschaft. Polyurethane-ureas based on cis-trans-1,4-diaminocyclohexane. Re. 29,623, Cl. 260-33.8UB.

Picker, Franck, to Oak Ridge Machines. Self-monitored fluid pressure booster system. Re. 29,620, Cl. 60-428.000.

Pullman Incorporated: *See*—
Lange, Karl H., Re. 29,622, Cl. 65-27.000.

Thoma, Wilhelm: *See*—
Oertel, Harald; Zorn, Bruno; Thoma, Wilhelm; and Noll, Klaus, Re. 29,623, Cl. 260-33.8UB.

Westinghouse Electric Corp.: *See*—
Conley, Thomas F.; and Gylland, Ernest F., Jr., Re. 29,621, Cl. 62-196.00A.

Zorn, Bruno: *See*—
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LIST OF PLANT PATENTEES

Bordier, Ernest P., to Bordiers Nursery, Inc. Eriobotrya hybrid. 4,245, 5-2-78, Cl. 54.000.

Bordiers Nursery, Inc.: *See*—
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Klehm Boys Partnership: *See*—
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Klehm, Roy G., 4,248, Cl. 68.000.
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Klehm, Roy G., to Klehm Boys Partnership. Peony plant named Coral Charm. 4,247, 5-2-78, Cl. 68.000.

Klehm, Roy G., to Klehm Boys Partnership. Peony plant named Cheddar Gold. 4,248, 5-2-78, Cl. 68.000.

Klehm, Roy G., to Klehm Boys Partnership. Peony plant named Bridal Icing. 4,249, 5-2-78, Cl. 68.000.

Rudolph, Nathan H., to Klehm Boys Partnership. Peony plant named America. 4,246, 5-2-78, Cl. 68.000.

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Beall, Lester, Jr., to Trend Line Furniture Corporation. Loveseat. 247,797, 5-2-78, Cl. D6-63.000.

Bell Telephone Laboratories, Incorporated: *See—*
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Biersch, Richard Allen; and Liebert, Martin, to Telautograph Corporation. Color comparator for testing swimming pools. 247,821, 5-2-78, Cl. D24-17.000.

Bulanda, John J.; and Wakely, Richard B., to Panduit Corp. Push mount. 247,801, 5-2-78, Cl. D8-349.000.

Calamand, Michel. Frame for eyeglasses. 247,816, 5-2-78, Cl. D16-65.000.

Campbell, Paul R.; and O'Neil, William J., Jr., to Procter & Gamble Company, The. Bottle. 247,804, 5-2-78, Cl. D9-168.000.

Christianson, Alfred L. Cribbage board. 247,825, 5-2-78, Cl. D34-5.0TT.

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Corbin Gentry, Inc.: *See—*
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Cunningham, William B., to Sonic Industries, Inc. Combined menu and serving tray support for a drive-in restaurant. 247,830, 5-2-78, Cl. D96-12.00R.

Dazey Products Co.: *See—*
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Fireplace Corporation of America: *See—*
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Genaro, Donald Michael; McGarvey, John Niel; and Sylvester, Gordon Elliot, to Bell Telephone Laboratories, Incorporated. Telephone stand. 247,813, 5-2-78, Cl. D14-60.000.

Gerdom, James Michael: *See—*
Talge, Foster Lisle, Jr.; and Gerdom, James Michael, 247,800, Cl. D7-156.000.

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Hanagan, Michael W., to Corbin Gentry, Inc. Motorcycle seat. 247,796, 5-2-78, Cl. D6-48.100.

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Hausmann, Else: *See—*
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Hausmann, Heinrich; and Hausmann, Else. Looseleaf binder. 247,817, 5-2-78, Cl. D19-27.000.

Hawk, Gary D. Bracket for holding jars, cans and the like. 247,803, 5-2-78, Cl. D8-373.000.

Hein, Gary L.; and Mowen, Donald R., to Lincoln Laboratories, Inc. Support base and holder for use in loading antigenic materials on a multi-applicator skin testing device. 247,822, 5-2-78, Cl. D24-31.000.

Holtorf, Ehrhard F. Goblet or similar article. 247,798, 5-2-78, Cl. D7-13.000.

Holtorf, Ehrhard F. Goblet or similar article. 247,799, 5-2-78, Cl. D7-13.000.

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Nakao, Shinroku; Ishii, Yoshiyasu; and Hanashima, Taira, 247,827, Cl. D34-15.00C.

Johnson, Logan W.; and Werner, James L., to Clark Equipment Company. Skid steer loader vehicle body. 247,814, 5-2-78, Cl. D15-23.000.

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Krecic, Elda, to Monet Jewelers, Inc. Pendant or similar article. 247,806, 5-2-78, Cl. D11-82.000.

Krecic, Elda, to Monet Jewelers, Inc. Pendant or similar article. 247,807, 5-2-78, Cl. D11-83.000.

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Liebert, Martin: *See—*
Biersch, Richard Allen; and Liebert, Martin, 247,821, Cl. D24-17.000.

Lincoln Laboratories, Inc.: *See—*
Hein, Gary L.; and Mowen, Donald R., 247,822, Cl. D24-31.000.

McGarvey, John Niel: *See—*
Genaro, Donald Michael; McGarvey, John Niel; and Sylvester, Gordon Elliot, 247,813, Cl. D14-60.000.

Meis, William J. Pulley bracket. 247,802, 5-2-78, Cl. D8-360.000.

Meissler, Ivan. Golf club head. 247,824, 5-2-78, Cl. D34-5.0GH.

Miles Mumford Limited: *See—*
Mumford, Michael Anthony, 247,826, Cl. D34-15.0JJ.

Moeckl, Ernst, to Nixdorf Computer A.G. Computer central processing unit cabinet. 247,810, 5-2-78, Cl. D14-42.000.

Moeckl, Ernst, to Nixdorf Computer A.G. Computer terminal work station. 247,811, 5-2-78, Cl. D14-44.000.

Mohr, Clifford D.: *See—*
Lever, Paul H.; and Mohr, Clifford D., 247,819, Cl. D23-97.000.

Monet Jewelers, Inc.: *See—*
Krecic, Elda, 247,806, Cl. D11-82.000.
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Moore, Walter E.; and Grethey, Albert K., to UMC Industries, Inc. Front display panel for vending machines. 247,828, 5-2-78, Cl. D52-3.00R.

Mowen, Donald R.: *See—*
Hein, Gary L.; and Mowen, Donald R., 247,822, Cl. D24-31.000.

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Moeckl, Ernst, 247,810, Cl. D14-42.000.
Moeckl, Ernst, 247,811, Cl. D14-44.000.

Olivan, Andre J. Truck cab caddy. 247,812, 5-2-78, Cl. D12-155.000.

O'Neil, William J., Jr.: *See—*
Campbell, Paul R.; and O'Neil, William J., Jr., 247,804, Cl. D9-168.000.

Panduit Corp.: *See—*
Bulanda, John J.; and Wakely, Richard B., 247,801, Cl. D8-349.000.

Procter & Gamble Company, The: *See—*
Campbell, Paul R.; and O'Neil, William J., Jr., 247,804, Cl. D9-168.000.

Rayburn, Donald G. Fishing leader keeper assembly. 247,818, 5-2-78, Cl. D22-99.000.

Renwick of Canada Inc.: *See—*
Schnitzer, Edmund, 247,829, Cl. D87-3.00B.

Romani, Anthony R. Comb. 247,823, 5-2-78, Cl. D28-21.000.

Rowenta-Werke, GmbH: *See—*
Stuetzer, Franz Alban, 247,820, Cl. D24-15.000.

Schnitzer, Edmund, to Renwick of Canada Inc. Coin display case. 247,829, 5-2-78, Cl. D87-3.00B.

Sonic Industries, Inc.: *See—*
Cunningham, William B., 247,830, Cl. D96-12.00R.

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SunneControls Division Peco, Inc.: *See—*
Taylor, Herbert J., 247,805, Cl. D10-50.000.

Sylvester, Gordon Elliot: *See—*
Genaro, Donald Michael; McGarvey, John Niel; and Sylvester, Gordon Elliot, 247,813, Cl. D14-60.000.

Talge, Foster Lisle, Jr.; and Gerdom, James Michael, to Dazey Products Co. Ice crusher. 247,800, 5-2-78, Cl. D7-156.000.

Taylor, Herbert J., to SunneControls Division Peco, Inc. Thermostat. 247,805, 5-2-78, Cl. D10-50.000.

Telautograph Corporation: *See—*
Biersch, Richard Allen; and Liebert, Martin, 247,821, Cl. D24-17.000.

Trend Line Furniture Corporation: *See—*
Beall, Lester, Jr., 247,797, Cl. D6-63.000.

UMC Industries, Inc.: *See—*
Moore, Walter E.; and Grethey, Albert K., 247,828, Cl. D52-3.00R.

Wakely, Richard B.: *See—*
Bulanda, John J.; and Wakely, Richard B., 247,801, Cl. D8-349.000.

Werner, James L.: *See—*
Johnson, Logan W.; and Werner, James L., 247,814, Cl. D15-23.000.

Woodward, Richard R., to GKN Kent Alloys Limited. Vehicle wheel. 247,808, 5-2-78, Cl. D12-211.000.

CLASSIFICATION OF PATENTS

ISSUED MAY 2, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

9 4,086,664

CLASS 3

1.4 4,086,665
36 4,086,666

CLASS 4

182 4,086,669
295 4,086,670
325 4,086,667
425 4,086,668

CLASS 5

18 R 4,086,671
81 R 4,086,672
92 4,086,673
113 4,086,674
355 4,086,675

CLASS 8

1 W 4,087,240
2.5 A 4,087,241
15 4,087,242
31 4,087,243
41 R 4,087,244
85 A 4,087,245
115.5 4,087,246
169 4,087,247

CLASS 9

7 4,086,676

CLASS 15

42 4,086,677
105 4,086,678

CLASS 16

4 4,086,679
30 4,086,680
49 4,086,681

CLASS 17

1 B 4,086,682
25 4,086,683
41 4,086,684

CLASS 23

230 B 4,087,248
253 PC 4,087,249
262 4,087,250
280 4,087,251
288 R 4,087,252
297 4,087,253
313 R 4,087,254

CLASS 24

201 R 4,086,685
250 4,086,686

CLASS 28

103 4,086,687
218 4,086,688

CLASS 29

33 B 4,086,689
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432 4,086,693
579 4,086,694
623.1 4,086,695
627 4,086,696
749 4,086,697

CLASS 30

2 4,086,698
172 4,086,699
276 4,086,700

CLASS 32

10 A 4,086,701
14 A 4,086,702

CLASS 33

164 R 4,086,703
169 C 4,086,704

CLASS 34

26 4,086,705
33 4,086,706
48 4,086,707
65 4,086,708
90 4,086,709

CLASS 35

22 R 4,086,710
25 4,086,711

CLASS 37

118 A 4,086,712
142 A 4,086,713

CLASS 38

77.82 4,086,714

CLASS 40

504 4,086,715

CLASS 43

6.5 4,086,717
17.2 4,086,718
21.2 4,086,716
44.9 4,086,719
113 4,086,720
4,086,721

CLASS 44

62 4,087,255
73 4,087,256
80 4,087,257

CLASS 46

61 4,086,722
74 D 4,086,723
256 4,086,724

CLASS 47

61 4,086,725

CLASS 48

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CLASS 49

37 4,086,726
255 4,086,727
460 4,086,728

CLASS 51

165.8 4,086,729
165.9 4,086,730
216 R 4,086,731
241 S 4,086,732
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CLASS 52

122 4,086,734
160 4,086,735
221 4,086,736
227 4,086,737
270 4,086,738
281 4,086,739
511 4,086,740

CLASS 53

12 4,086,741
29 4,086,742
79 4,086,743
137 4,086,744
159 4,086,745
188 4,086,746
340 4,086,747

CLASS 55

28 4,087,260
41 4,087,261
52 4,087,262
320 4,087,263
418 4,087,264

CLASS 56

98 4,086,748
4,086,749
400.18 4,086,750

CLASS 57

157 TS 4,086,751

CLASS 58

23 D 4,086,753
23 R 4,086,752
50 R 4,086,754
85.5 4,086,755
152 R 4,086,756

CLASS 60

39.02 4,086,758
39.08 4,086,759
39.16 R 4,086,757
39.36 4,086,760
226 R 4,086,761
282 4,086,762
4,086,763
325 4,086,764
4,086,765
330 4,086,766
395 4,086,767
428 Re.29,620
484 4,086,768
527 4,086,769
562 4,086,770
616 4,086,771
651 4,086,772
664 4,086,773

CLASS 61

13 4,086,774
20 4,086,775
69 R 4,086,776
97 4,086,777
110 4,086,778

CLASS 62

63 4,087,265
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180 4,086,781
196 A Re.29,621
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374 4,086,783
4,086,784
414 4,086,785

CLASS 63

13 4,086,786

CLASS 64

10 4,086,787
23 4,086,788

CLASS 65

2 4,087,266
5 4,087,267
27 Re.29,622
129 4,087,268

CLASS 66

9 B 4,086,789
178 A 4,086,790
207 4,086,791
4,086,792

CLASS 69

32 4,086,793

CLASS 70

134 4,086,794
233 4,086,795
456 B 4,086,796

CLASS 71

92 4,087,269
95 4,087,270
98 4,087,271
100 4,087,273
105 4,087,277
106 4,087,278
120 4,087,272

CLASS 72

20 4,086,797
82 4,086,798
114 4,086,799
205 4,086,800
234 4,086,801
391 4,086,802
466 4,086,803

CLASS 73

4 R 4,086,804
49.5 4,086,806
161 4,086,809
179 4,086,810
231 R 4,086,811
308 4,086,812
352 4,086,813
359 R 4,086,805
587 4,086,816
4,086,817
620 4,086,818
652 4,086,807
655 4,086,808
717 4,086,814
721 4,086,815

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221 4,086,821
473 R 4,086,822
474 4,086,823
481 4,086,824
492 4,086,825
713 4,086,826
759 4,086,827

CLASS 75

10 R 4,087,274
35 4,087,275
81 4,087,276

CLASS 81

3 K 4,086,828
52.4 R 4,086,829
57.39 4,086,830
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CLASS 83

198 4,086,832
205 4,086,833
326 4,086,834
484 4,086,835
521 4,086,836
698 4,086,837

CLASS 84

1.25 4,086,838

CLASS 85

37 4,086,839
80 4,086,840

CLASS 89

1.5 E 4,086,841

CLASS 91

369 A 4,086,842
413 4,086,843
418 4,086,844
483 4,086,845

CLASS 93

77 FT 4,086,846

CLASS 96

1 SD 4,087,279
27 R 4,087,280
36 4,087,281
94 R 4,087,282
111 4,087,283

CLASS 98

115 VM 4,086,847

CLASS 99

323 4,086,848
357 4,086,849

CLASS 100

42 4,086,850

CLASS 101

4 4,086,851
147 4,086,852
463 4,086,853

CLASS 104

166 4,086,854
172 BT 4,086,855

CLASS 105

1 A 4,086,856

CLASS 106

21 4,087,284
52 4,087,285

CLASS 108

106 4,086,857
110 4,086,858
142 4,086,859

CLASS 112

153 4,086,860
158 E 4,086,861
4,086,862

CLASS 114

61 4,086,863
74 A 4,086,864
230 4,086,865
295 4,086,866

CLASS 115

14 4,086,867
24.4 4,086,868
41 HT 4,086,869

CLASS 118

52 4,086,870
60 4,086,871
630 4,086,872
658 4,086,873

CLASS 119

3 4,086,874
4,086,875
5 4,086,876

CLASS 123

1 A 4,086,877
4,086,878
23 4,086,883
32 EB 4,086,884
32 ST 4,086,885
41.65 4,086,886
90.39 4,086,887
102 4,086,888
117 A 4,086,889
119 EC 4,086,890
122 AB 4,086,891
122 AC 4,086,892
4,086,896
122 E 4,086,893
136 4,086,897
140 MP 4,086,898
141 4,086,899
148 E 4,086,895
148 S 4,086,894
198 D 4,086,900
205 4,086,880
216 4,086,879
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228 4,086,881

CLASS 124

21 4,086,901
61 4,086,902
78 4,086,903
90 4,086,904

CLASS 126

25 A 4,086,905
140 4,086,906
246 4,086,907
270 4,086,908
4,086,909
271 4,086,910
4,086,911
4,086,912
4,086,913

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2 L 4,086,915
2.05 T 4,086,916
4,086,917
2.08 4,086,918
11 4,086,919
24 R 4,086,920
24.2 4,086,921
24.3 4,086,922
140 R 4,086,923
214 R 4,086,924
272 4,086,925
334 R 4,086,926

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17 R 4,086,927

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3 A 4,086,928

CLASS 134

56 D 4,086,929
167 R 4,087,286
168 R 4,086,930

CLASS 135

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67 4,086,932

CLASS 137

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586 4,086,938
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625.69 4,086,940

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CLASS 141

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CLASS 144

3 P 4,086,944

CLASS 148

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6.2 4,087,288
12 R 4,087,289
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31.57 4,087,291
32.5 4,087,292
33 4,087,293
4,087,294
143 4,087,295

CLASS 150

52 J 4,086,945

CLASS 151

21 C 4,086,946

CLASS 152

175 4,086,947
355 4,086,948
359 4,086,949

CLASS 156

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73.4 4,087,297
136 4,087,298
184 4,087,300
192 4,087,299
198 4,087,301
204 4,087,302
357 4,087,303
384 4,087,304
401 4,087,305
4,087,306
4,087,307
405 R 4,087,308
497 4,087,309
505 4,087,310
511 4,087,311
552 4,087,312
602 4,087,313
643 4,087,314
656 4,087,315

CLASS 160

332 4,086,950

CLASS 162

14 4,087,316
23 4,087,317
60 4,087,318
113 4,087,319
252 4,087,320
343 4,087,321

CLASS 164

73 4,086,951
88 4,086,952
312 4,086,953
404 4,086,954
446 4,086,955

CLASS 165

38 4,086,956
89 4,086,957
104 S 4,086,958
155 4,086,959

CLASS 166

59 4,086,960
245 4,086,961
259 4,086,962
4,086,963
272 4,086,964

CLASS 172

149 4,086,965
767 4,086,966
777 4,086,967

CLASS 173

115 4,086,968
149 4,086,969
162 4,086,970

CLASS 174

57 4,087,624

CLASS 175

7 4,086,971
65 4,086,972
374 4,086,973

CLASS 176

3 4,087,322
38 4,087,323
52 4,087,324
65 4,087,325

CLASS 178

19 4,087,625
22 4,087,626
69.1 4,087,627
88 4,087,628

CLASS 179

1 G 4,087,629
4,087,631
1 P 4,087,633
1 SD 4,087,630
4,087,632
2 A 4,087,637
2 DP 4,087,635
2 E 4,087,638
2 EA 4,087,636
2.5 R 4,087,639
15 A 4,087,640
15 AL 4,087,643
15 BM 4,087,642
15 BT 4,087,641
16 E 4,087,644
18 FA 4,087,645
4,087,646
77 4,087,647
98 4,087,648
99 4,087,649
100 D 4,087,650
100.3 L 4,087,634
100.3 R 4,087,651
147 4,087,652
156 R 4,087,653
170.2 4,087,654
175 4,087,655
175.3 R 4,087,656
4,087,657
4,087,658
186 4,087,659

CLASS 180

9.5 4,086,974
14 R 4,086,975
54 A 4,086,976
64 A 4,086,977

CLASS 182

82 4,086,978
93 4,086,979
151 4,086,980

CLASS 184

1.5 4,086,981

CLASS 187

8.54 4,086,982
29 R 4,086,983

CLASS 188

1 B 4,086,984
72.4 4,086,985
73.3 4,086,986

CLASS 192

58 B 4,086,987
4,086,988
4,086,989
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82 T 4,086,991
076 4,086,992
104 F 4,086,993
109 F 4,086,994
111 A 4,086,996
111 B 4,086,995

CLASS 195

1.7 4,087,327
63 4,087,328
66 R 4,087,329
99 4,087,331
103.5 R 4,087,326
127 4,087,332

CLASS 198

358 4,086,998
377 4,086,999
454 4,087,000
456 4,087,001

CLASS 200

50 R 4,087,661
81.8 4,087,662
84 R 4,087,663
145 4,087,664
153 LB 4,087,665
158 4,087,666
245 4,087,667
254 4,087,668
340 4,087,669

CLASS 202

227 4,087,333
269 4,087,334

CLASS 203

6 4,087,335

CLASS 204

75 4,087,336
95 4,087,337
112 4,087,338
4,087,339
117 4,087,340
129.43 4,087,341
157.1 R 4,087,342
219 4,087,343
239 4,087,344
243 R 4,087,345
299 R 4,087,346

CLASS 206

523 4,087,002
583 4,087,003

CLASS 208

11 R 4,087,347
108 4,087,348
4,087,349
121 4,087,350
139 4,087,351
4,087,352
143 4,087,353
251 R 4,087,354
330 4,087,355

CLASS 209

9 4,087,004
80.5 4,087,005

CLASS 210

11 4,087,356
32 4,087,357
42 S 4,087,358
50 4,087,359
58 4,087,360
199 4,087,361
249 4,087,362
315 4,087,363

CLASS 211

86 4,087,006

CLASS 214

75 T 4,087,007
86 A 4,087,008
131 A 4,087,009
145 R 4,087,010
152 4,087,011
312 4,087,012
392 4,087,013
450 4,087,014

CLASS 215

201 4,087,015
211 4,087,016

CLASS 219

121 LM 4,087,672
121 P 4,087,670
4,087,671
137 WM 4,087,673
146.1 4,087,674
211 4,087,675
216 4,087,676

CLASS 220

257 4,087,018
258 4,087,019
441 4,087,041
445 4,087,017

CLASS 221

84 4,087,020
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CLASS 222

183 4,087,022
209 4,087,023
211 4,087,024
321 4,087,025
386.5 4,087,026
402.13 4,087,027
556 4,087,028

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6 4,087,030
25 A 4,087,031
42.1 H 4,087,029
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CLASS 225

1 4,087,033

CLASS 227

90 4,087,034
120 4,087,035

CLASS 228

102 4,087,036
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112 4,087,038
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CLASS 229

2.5 EC 4,087,040
44 EC 4,087,042

CLASS 233

26 4,087,043

CLASS 235

86 4,087,678
301 4,087,044
441 4,087,679
449 4,087,660
4,087,680
466 4,087,681

CLASS 236

1 G 4,087,045
11 4,087,046

CLASS 237

12.3 B 4,087,047

CLASS 239

146 4,087,048
267 4,087,049
490 4,087,050

CLASS 241

27 4,087,051
65 4,087,052
282.1 4,087,053

CLASS 242

7.05 B 4,087,054
18 DD 4,087,055
43 R 4,087,056
68.3 4,087,057
84.51 A 4,087,058
107.4 A 4,087,059
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CLASS 244

3.16 4,087,061
100 R 4,087,062
148 4,087,063
172 4,087,064
836 4,087,065

CLASS 246

167 R 4,087,066
4,087,067

CLASS 248

96 4,087,068
400 4,087,069
406 4,087,070
4,087,071

CLASS 249

129 4,087,072

CLASS 250

213 VT 4,087,683
231 R 4,087,684
302 4,087,685
322 4,087,686
331 4,087,687
342 4,087,688
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343 4,087,690
347 4,087,691
370 4,087,692
390 4,087,693
445 T 4,087,694
492 B 4,087,695

CLASS 251

28 4,087,073
58 4,087,074
214 4,087,075

CLASS 252

8.1 4,087,364
8.5 A 4,087,365
49.8 4,087,386
62.9 4,087,366
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37 SB 4,087,399
40 R 4,087,401
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67 FP 4,087,411
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77.5 CH 4,087,413
77.5 NC 4,087,414
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112.5 LH 4,087,416
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6 : 247,812
247,818
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9 : 247,796
17 : 247,801
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19 : 247,802
20 : 247,800
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25 : 247,809

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34 : 247,813
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37 : 247,797
39 : 247,804
40 : 247,830

41 : 247,805
42 : 247,823
48 : 247,825

PLANT PATENTS

6 : 4,245

17 : 4,246

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[Notice of Dec. 16, 1969, 869 O.G. 6877]

1 : T970,007
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